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An Analysis OF CASES OF TETANUS

OCCURRING IN THE BRITISH ARMIES IN FRANCE BETWEEN NOV. 1ST, 1916, AND DEC. 31ST, 1917.

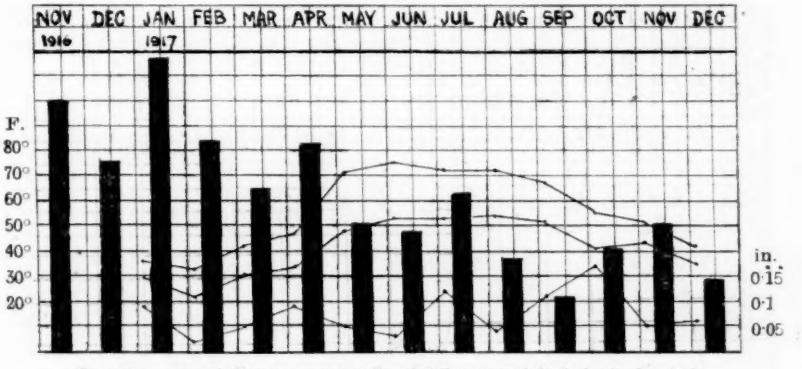
BY S. L. CUMMINS, C.M.G., M.D., LL.D.N.U.I.,
COLONEL, A.M.S.;
AND
H. GRAEME GIBSON, M.R.C.S., L.R.C.P. LOND.,
MAJOR, R.A.M.C.

THE present analysis is a continuation of that published by Colonel Sir William Leishman and Major A. B. Smallman.[1] All the information at our disposal has been collected under the direction and supervision of Sir William Leishman himself and would have been dealt with by him in due course but for his transfer to the War Office. In arranging the material handed to us by him we propose to adhere closely to his methods of tabulation and to allow the tables and charts, as far as possible, to speak for themselves. Such an analysis would, however, lose much of its interest and value if it were to consist merely in the setting forth of the information in tabular form without any attempt, on the part of the authors, to formulate the impressions which they have gained in their examination of the material available. We shall therefore venture to draw such conclusions as we consider to be justified; at the same time expressing our regret that circumstances have made it impossible for Sir William Leishman himself to deal with the facts collected under his direction and in the arrangement of which his great experience and knowledge wouldhave been invaluable.

CASE INCIDENCE.

The records at our disposal cover the period from Nov. 1st, 1916, to Dec. 31st, 1917, and deal with a total of 376 cases. During this period complete figures for tetanus cases among the British battle casualties are available and the case-incidence per 1000 shows a moderately steady decrease. The "total wounded" on which Chart I. is founded does not include "wounded (gas)." The rainfall, though following to a certain extent the minor fluctuations, does not appear to bear any definite relation to the case-incidence, which is actually lower during the wettest months of the period under observation. Temperature, however, may perhaps have some effect, as the ground tends to dry up more rapidly in the summer and early autumn. On the whole, Chart I. shows a satisfactory fall in the case-incidence of tetanus during the summer and autumn of 1917.

CHART I.—*Ratio of Case-incidence to Battle Casualties over Period Nov., 1916, to Dec., 1917.*



The bottom curve indicates average daily rainfall per month in decimals of an inch. The upper curves show the average maximum and minimum temperature.

CASE MORTALITY.

Of the 376 cases dealt with, 252 died and 124 recovered, a case mortality of 67 0 per cent. Of the total deaths, 13 were from causes other than tetanus. As, however, it is impossible to evaluate successfully the relative importance of the factors leading to death in cases that have just passed through an attack of tetanus, we have thought it better to include these deaths in the total mortality.

Table I. gives the case mortality of the present series and of the two previous analyses of tetanus cases in the British Expeditionary Force. It is satisfactory to be able to record a continued improvement in this respect.

TABLE I.—*Case Mortality of Present Series Compared with that of Former Series in the B.E.F.*

—	No. of cases.	Died.	Recovered.	Case-mortality.
July, 1915	179	140	39	78·2%
July–October, 1916	160	118	42	73·7%
Present series...	376	252	124	67·0%

TABLE I.A.—*Distribution of Cases of Tetanus, together with the Case Mortality in Each Group.*

(*a*) British battle casualties	291	191	100	65·6%
(*b*) "Trench feet"...	24	21	3	87·5%
(*c*) Accidental...	48	26	22	54·1%
(*d*) German prisoners	13	9	4	69·2%

TABLE I.B.—*Case Mortality of Present Series of Cases when Grouped in Chronological Order.*

1st group	63	47	16	74·5%
2nd ,, ...	63	48	15	76·1%
3rd ,, ...	63	45	18	71·4%
4th ,, ...	63	40	23	63·4%
5th ,, ...	63	36	27	57·1%
6th ,, ...	61	36	25	59·0%

Table I.B. shows the case mortality of the present series when grouped in chronological order. The first group consists of the first 63 cases, the second group of the next 63 cases, and so on. The case mortality of the first group was 74·5 per cent., of the second group 76·1 per cent., of the third group 71·4 per cent., of the fourth group 63·4 per cent., of the fifth group 57·1 per cent., and of the sixth group 59·0 per cent. The case mortality of the last group is probably not yet complete, as some of the cases were still under treatment when the records were closed.

The 376 cases of the present series fall into four groups: (*a*) Cases among British battle casualties, 291; (*b*) cases among men suffering from "trench feet," 24; (*c*) cases due to accidents and other causes, 48; (*d*) cases among German prisoners of war, 13. Each of these groups has its own rate of case mortality, as shown in Table I. A.

In the previous analysis the case mortality for the period July–October, 1916, was 73 7 per cent. If the whole of the 376 cases, taken in chronological order, are divided into six groups—five groups of 63 and the sixth group of 61—and the case mortality of each group is examined separately, a fairly steady fall will be noted. (Table I.B.)

POSITION OF WOUNDS WITH REFERENCE TO CASE MORTALITY.

The following figures show the relative frequency of body and limb wounds in cases of tetanus in this series of cases and in the series July–October, 1916. Where wounds of the body and limbs occur in the same case it has been counted as a case of body wound only. The increase in the

TABLE II.—*Ratio between the Number of Cases suffering from Wounds of the Limbs and Body.*

Series.	Body.	Limbs.
July–October, 1916: 157 cases...	79. 50·3 %	78. 49·7 %
Present series: 371 ,, *...	144. 38·8 %	227. 61·1 %

TABLE II.A.—*The Position of the Wounds in Reference to Case Mortality.*

Fatal cases: 251	102. 40·6 %	149. 59·3 %
Recoveries: 120	42. 35·0 %	78. 65·0 %

[1] THE LANCET, Jan. 27th, 1917; Journal of Royal Army Medical Corps, March, 1917.

* Definite information was obtainable on these points in 371 cases.

percentage of wounds of the limb is exaggerated, to a certain degree, by the inclusion of more cases of tetanus from "trench feet" in this series.

Table II A shows the relative incidence of body to limb wounds in the fatal cases and those which recovered. Very little can be deduced from these figures, a slightly lower percentage of body wounds, however, being recorded amongst the recovered cases than in the previous analysis.

The relative frequency of sepsis, gas gangrene, the extent and the multiplicity of wounds amongst the tetanus cases under consideration is shown in Tables III. and III.A. A comparison has also been worked out between the frequency of these conditions in cases in the present series and among cases in the last analysis. The two series correspond in a striking degree with the exception that gas gangrene has dropped to 19 9 per cent. in the later series.

With regard to the effect of these factors on the case mortality, we consider that it would be dangerous to draw conclusions. Each of the headings necessarily includes many cases common to the others, and the relative influence of each factor is obscure. The extent and severity of the original wound naturally plays a predominant part.

INCUBATION PERIOD.

Records of the incubation period are available in 343 out of the 376 cases. The time between wounding and the onset of tetanic symptoms varied from 18 hours—a case of a gunshot wound of the right thigh with fracture of the femur in which no history of any previous injury could be elicited—to 180 days. This latter case has been eliminated for the purpose of working out the average incubation period, which, for 342 cases, was 13·2 days, a little over one day longer than in the previous analysis. Of the fatal cases, 230 in number, the average period was 12 5 days compared with 10·7 in the July–October analysis, and of the 112 recoveries 14 9 as compared with 14·0 days. The difference in the incubation period of fatal cases and recoveries is 2·5 as compared with a fraction over 3 days in the last analysis and 2 75 days in the analysis of July, 1915.

A curve of the incubation periods by days is attached (Chart II.). The peak of the curve is a day earlier than in

CHART II.

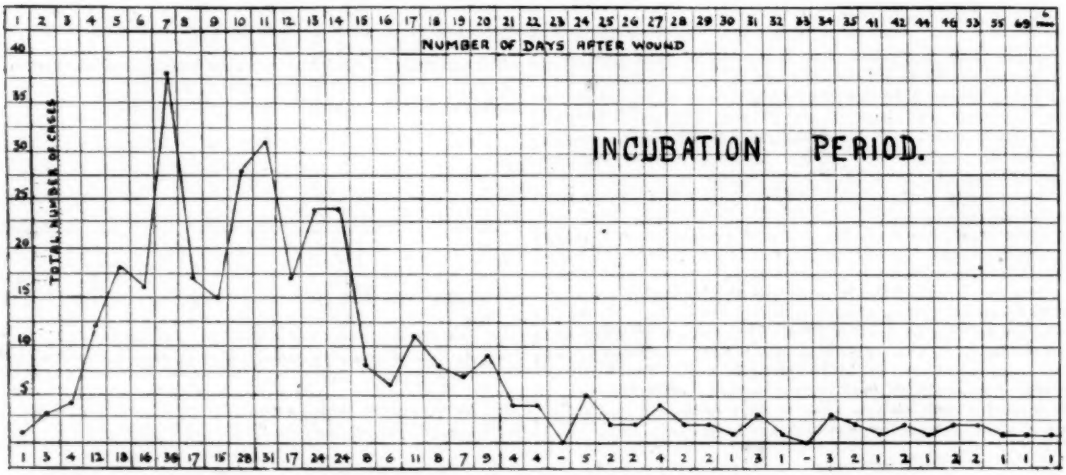


CHART III.

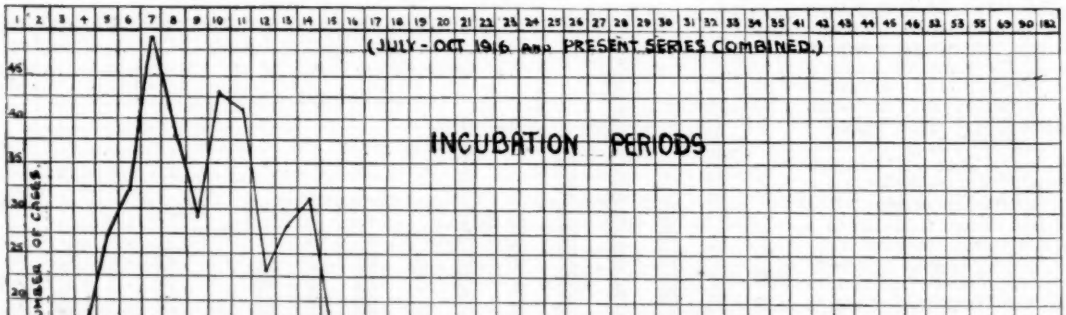


TABLE III.—*Condition of Wounds as regards Sepsis, Gas Gangrene, &c.*

—	Severe sepsis.	Gas gangrene.	Extensive or severe wound.	Multiple wounds.
July-October, 1916: 155 cases	112. 72·2%	66. 42·5%	124. 80·0%	80. 51·6%
Present series: 371 cases	278. 74· %	74. 19·9%	293. 78·9%	190. 51·2%

TABLE III.A.—*Condition of Wounds in Reference to Case Mortality.*

Fatal cases, 251	194. 77·2 %	56. 22 3 %	205. 81·6 %	131. 52·1 %
Recoveries, 120	84. 70·0 %	18. 15·0 %	88. 73·3 %	59. 49·1 %

the previous analysis, being reached on the seventh day instead of on the eighth.

A combined curve of the present and previous series is also appended (Chart III.).

Table IV. shows the case mortality for varying incubation periods from 10 days and under to 22 days and over. Of

TABLE IV.—*Incubation Period per Cent. of Cases.*

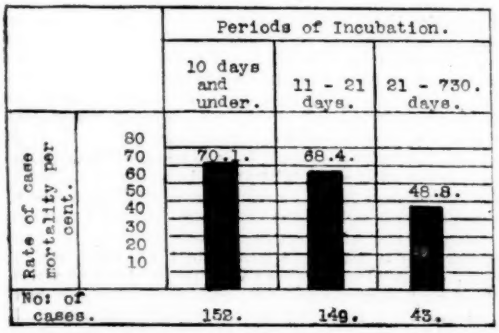
Analysis.	10 days and under	11-21 days.	22 days and over.
July–October, 1916	53·8%	31·8%	8·2%
Present series	44·1%	43·3%	12·2%
Combined	49·2%	39·8%	11·0%
Home cases, Dec. 1916, to March, 1917	10·0%	21·0%*	69·0%†

* = 11 to 22 days. † = Over 22 days.

the present series of cases 44·1 per cent. had an incubation period of 10 days or less, 43·3 per cent. of between 11 and 21 days, and 12·2 per cent. of 22 days and over. When divided in this way the present figures show a lengthening of the incubation period as compared to those of July–October, 1916.

The close connexion between the length of the incubation period and the case mortality is shown graphically in Chart IV. This connexion should not be lost sight of in

CHART IV.—*The Relation between Incubation Period and Case Mortality*



comparing the results of treatment in cases occurring in England with those in France.

INFLUENCE OF OPERATION BEFORE ONSET OF TETANUS.

Tetanus occurred after amputation affecting the upper or lower limbs in 59 cases, or in 15 per cent. of all the cases in the series. Of these 59 cases, 38 died as a result of tetanus and 15 recovered, while 6 died from sepsis and other causes after the tetanic symptoms had subsided. Among the 59 cases 42, or 71·1 per cent. occurred after amputation of the lower limb, and 16, or 27·1 per cent., after amputation of the upper limbs, while in one case both an upper and a lower limb had been amputated. Among the cases of amputation of the lower limbs in which tetanus subsequently developed the case mortality was 76·3 per cent.; in the case of the upper limbs 60·0 per cent. The one patient in whom both an upper and lower limb were amputated recovered from his tetanic symptoms, but died from bronchial pneumonia 30 days later.

INFLUENCE OF OPERATION AFTER ONSET OF TETANUS.

Operative interference was resorted to after the appearance of tetanic symptoms in 27 cases or 7·1 per cent of the total number of cases. Of these 22 died and 5 recovered, giving a case mortality of 81·48 per cent. This is an even higher case mortality than in the last analysis, where 7 died out of a total of 9 cases, a case mortality of 77·7 per cent. Table IV.A gives the nature of the operations performed, the period between the onset of tetanic symptoms and the operation, and the result.

THE PROPHYLACTIC USE OF TETANUS ANTITOXIN.

It is a matter of great interest that nearly one-fifth of the total number of cases arising in the period under review occurred amongst persons to whom no inoculation had been given. These were chiefly patients suffering from trench

TABLE IV.A.—*Operative Interference After Appearance of Tetanus.*

Series No.	Date of onset.	Date of operation	Result.	Nature of operation.
N. 2	Nov. 3, 1916.	Nov. 3.	D.	Amp. middle of left calf.
N. 18	,, 15, ,,	,, 15.	D.	Opening up wound.
N. 23	,, 20, ,,	,, 21.	D.	Excision of wound, drainage.
N. 32	,, 16, ,,	,, 17.	R.	Amputation left forearm.
D. 1	Dec. 5, ,,	Dec. 5.	D.	Sloughing area excised.
D. 12	,, 20, ,,	,, 20.	D.	Amputation finger.
D. 21	,, 25, ,,	,, 25.	D.	Sloughing area excised.
14	Jan. 8, 1917.	Jan. 11.	R.	Neck drained, F.B. removed.
13	Feb. 10, ,,	Feb. 10	D.	Amputation thigh.
23	Mar. 3, ,,	Mar. 3.	D.	Free exposure of wound.
47	,, 20, ,,	,, 20.	R.	Abscess opened.
49	,, 30, ,,	,, 31.	D.	Nail removed.
63	April 16, ,,	April 17.	D.	Wound incised and drained.
128	,, 12, ,,	,, 12.	R.	Excision of wound.
86	May 3, ,,	May 5.	D.	F.B. removed.
88	,, 7, ,,	,, 9.	D.	Wounds opened.
110	,, 20, ,,	,, 20.	D.	F.B. removed.
112	,, 19, ,,	,, 19.	D.	Abscess opened.
156	,, 18, ,,	,, 19.	D.	G.S.W. shoulder. Arm moved under anæsthetic.
204	July 16, ,,	July 24.	R.*	Fragment of tibia removed. Wound sutured.
206	Aug. 24, ,,	Aug. 28.	D.	Extensive incisions.
226	Oct. 5, ,,	Oct. 6	D.	Wound excised.
239	,, 17, ,,	,, 20.	D.	For secondary hæmorrhage.
241	,, 22. ,,	,, 24.	D.	,, ,,
251	,, 24, ,,	5½ hrs. later.	D.	Amputation right leg.
277	Aug. 7, ,,	Few hrs later.	D.	,, finger.
283	Nov. 29, ,,	Nov. 30.	D.	,, left leg.

* Tetanic symptoms ceased 4/8/17.

foot or cases of accidental injury. In December, 1916, an order was sent out from the office of the Director-General Medical Services, that prophylactic inoculation was to be given in all cases of trench foot, and this order became of general application from the beginning of 1917 onwards. It may be added that of the 14 cases arising amongst uninoculated patients suffering from trench foot between November, 1916, and Dec. 31st, 1917, no less than 13 occurred before the issue of the order above referred to.

Influence of Early Administration of the Prophylactic Dose.

It is not possible to ascertain the proportion of all wounded who received a prophylactic inoculation within 24 hours of wounding, nor the total number to whom the

TABLE V.—*Influence of Early or Late Prophylactic Dose on Case Mortality.*

Prophylactic dose.	No. of cases.	Died.	Recovered.	Case mortality.
Within 24 hours of wound	226	143	83	63·2%
More than 24 hours after wounding	46	33	13	71·7%

TABLE V.A.—*Amount of Initial Dose and Case Mortality.**

No prophylactic dose	70	48	22	68·5%
500 units	161	109	52	67·6%
750–1000 units...	52	27	25	51·9%
1001–1500 units	13	6	7	46·1%

TABLE V.B.—*Case Mortality in Cases Receiving only One Prophylactic Dose.**

500 units	119	90	29	75·7%
750–1000 units...	27	12	15	44·5%
1000–1500 units	12	5	7	41·7%

* In cases receiving this prophylactic dose within 24 hours.

inoculation was given at a later period. The case incidence in these two groups cannot, therefore, be estimated. From the figures at our disposal we are able to compare the case mortality in those receiving the early inoculation with those

in which this was not given until later than 24 hours and the results are set forth in Table V. It will be seen that the results, as far as they go, point to a decidedly lower case mortality in those receiving the earlier dose.

Size of Prophylactic Dose.

During the whole of the period covered by the previous analysis and up to July, 1917, or the first eight months of the period included in the series now under examination, the prophylactic dose had been, in practically all cases, 500 antitoxic units, and this dose undoubtedly gave very satisfactory results.

When the production of antitetanic serum had been placed on such a footing as to ensure a constant and adequate supply the question naturally arose as to whether a more liberal dose might not be still more efficacious in cases of gross contamination of the wound. In July, 1917, an instruction was circulated to all concerned from the Office of the Director-General, Medical Services, recommending that a dose of 1000 to 1500 units should be given "in all deep wounds, in those which are contaminated by dirt, and in those in which there is a fracture of bone." This period onward in the series marks not only the lowest ratio of tetanus cases to battle casualties, but shows also a considerable fall in the case mortality of this disease.

In view of the Director-General's circular above referred to, it may be assumed that a considerable number of cases have received the larger doses therein recommended, yet the number of tetanus cases recorded as arising amongst persons to whom the larger dose had been given is very small. This appears to suggest that the increased dose is proving effective in reducing case-incidence; but, again, statistical information is not available to render possible a reliable comparison between the case-incidence in groups of wounded to whom different prophylactic doses had been given.

Failing such statistical information, an indication was once more sought in the mortality in groups of cases occurring after different doses, and the results are shown in Table V.A. In this table only those cases in which the first dose had been given within 24 hours are included, as the varying interval between infection and the prophylactic doses given at later periods bring in large possibilities of error. It will be seen that the mortality was highest amongst those in which no prophylactic dose had been given, and that it fell steadily as the dose increased.

In order still further to diminish factors of error, it was decided to exclude those cases which had received a second prophylactic dose before the onset of symptoms. Table V.B. deals with those cases in which only a single prophylactic dose had been given within 24 hours of wounding. Although the figures, especially those referring to the larger doses, are too small to justify final conclusions, the information so far available tends to point towards a favourable influence of the larger prophylactic dose on the case mortality where tetanus subsequently develops.

THE THERAPEUTIC USE OF TETANUS ANTITOXIN.

Of the 376 cases in the present series, all but four, each of them fatal, were treated with antitoxin, so the tables now to be discussed deal with 372 cases. We have arranged our material in Tables VI. to XVI., which correspond to, and should be compared with, Tables VI. to XVI. of the previous analysis. As in the previous tables, we employ the letter T to signify the intrathecal method; V the intravenous; S the subcutaneous; and M the intramuscular.

In comparing Table VI. with the corresponding table of the previous analysis it will be seen that there has been a tendency to give larger doses, 195 (or 52 per cent.) receiving upwards of 20,000 units, as compared with 41 (or 26 per cent.) in the former series. It will be observed that the case mortality of the whole series is 66 per cent., a figure which compares favourably with 73·7 per cent. in the previous analysis.

In Tables VII. to XI. we have followed the method of tabulation adopted by Sir William Leishman and Major Smallman, and for the purpose of facilitating comparison we have reproduced their figures along with ours. Table VII. shows the total number of cases treated by serum (with or without non-specific treatment), together with the number of deaths and the case mortality per cent. The table also shows the number of cases treated by any one of the four available routes alone or in combination with one or more of the three other routes. Tables VIII. to XI. show all cases treated by the intrathecal, intravenous, subcutaneous, and intramuscular routes, either alone or in combination with one or more of the other routes.

It will be seen in Table VII. that the analysis of a larger number of cases leads to results corresponding closely with the previous figures. On the whole, however, the difference between the results of treatment by the several routes tend to be less marked. Extreme variations from the mean are only seen in those groups where the total numbers are small. For instance, the intravenous route still shows a mortality of 100 per cent., but this figure is based on a total of four cases only.

In Tables VIII. to XI. a noticeable feature is the same tendency to "levelling up" observed in Table VII. It would seem that the larger the number of cases available for comparison the smaller tend to be the differences between the combinations of the various methods of injection of antitetanic serum. In Table VIII., for instance, the mortality for the T.S.M. combination, formerly 25 per cent., is 58·5 per cent. for the new series. It is to be noted that the total mortality for all the administrations in which the intrathecal route is included falls from 75 per cent. to 68·2 per cent., a figure not strikingly different from the 66·6 per cent. mortality in the whole series of cases treated with serum. The mortality in the cases treated by the intravenous route and its combinations (Table IX.) falls in the new series to 78·9 per cent., a very small difference which perhaps merely emphasises the resemblance to previous records. This result is, however, based on such a small number of cases that no very definite inference can be drawn. The deaths following the administration of serum by the subcutaneous route alone rise from 55 per cent. in the previous series to 78·2 per cent. in the cases now under consideration, while the mortality following the intramuscular route alone moves in the opposite direction, falling from 75 to 55 per cent.

It is possible that the rather high mortality still recorded after the use of the intrathecal route alone is to be attributed rather to the selection of this channel in desperate cases, with a view to giving a last chance to the patient, than to any inefficiency connected with this route. It may prove, however, that the high mortality associated with the intravenous route is significant, although based on small figures, and it should be mentioned that the only two fatal cases of anaphylaxis in the series occurred where this route, among others, was employed. If the figures of the previous series be added to those of the present it will be seen (Table IX.)

TABLE VI.—*Showing the Total Number of Cases Treated by Serum.*

The cases are grouped according to the total dosage, together with the case mortality. The groups are subdivided to show how many cases fall into each one of the 15 possible combinations.

Dose (in units).	No. of cases.	Died.	Case mortality	Methods of administration.													
				T.	V.	S.	M.	T.V.	T.S.	T.M.	V.S.	V.M.	S.M.	T.V.S.	T.V.M.	T.S.M.	V.S.M.	T.V.S.M.
1,001- 5,000 ...	32	30	93·7%	10	1	10	6	—	1	3	—	—	1	—	—	—	—	—
5,001- 10,000 ...	82	40	76·9%	5	—	—	8	2	14	14	—	1	3	—	2	3	—	—
10,001- 20,000 ...	93	74	79·5%	6	1	5	17	3	8	23	1	2	7	4	4	12	—	—
20,001- 50,000 ...	113	67	59·2%	4	1	4	18	3	11	31	4	—	11	1	6	16	—	3
50,001-100,000 ...	52	25	48·0%	—	1	4	6	1	2	16	—	1	3	2	6	6	—	4
Above 100,000 ...	30	12	40·0%	—	—	—	5	—	1	15	—	—	2	1	2	4	—	—
Totals	372	248	66·6%	25	4	23	60	9	37	102	5	4	27	8	20	41	—	7

Four cases received no serum treatment; all died—100% case mortality.

that of 112 cases treated by the intravenous group and its combinations 89 died, representing a case mortality of 79 4 per cent. Although this high death-rate may be due in part to the employment of the intravenous route in the severest cases, still we cannot avoid the impression that the intravenous route presents dangers which are not encountered in the other three routes. This risk may sometimes, however, be well worth incurring in order to obtain a rapid effect.

Turning to the question of the subcutaneous, intramuscular, and intrathecal routes, the intramuscular combinations are once more found to be attended with the smallest mortality and the intrathecal with the highest of the three, but it is probable that several factors may play a part in this apparent inequality in the results.

In view of the great importance of making available at the earliest possible moment the largest possible dose of antitoxin, we consider that, in any given case, all three routes should be made use of, the intrathecal channel being exploited with the others as far as its limitations permit.

Like the authors of the previous paper, whom we quote, we are led by an examination of the tables to "fully appreciate the many pitfalls into which one may stumble in searching for truth among small figures dealing with cases presenting so many complicating factors."

TABLE VII.—*Cases Treated by Serum: Deaths and Case Mortality.*

Methods of administration.	No. of cases.		Died.		Case mortality per cent.*	
	Present series.	Leishman and Smallman	Present series.	Leishman and Smallman	Present series.	Leishman and Smallman
T.	25	25	22	21	88	84
V.	4	7	4	7	100	100
S.	23	27	18	15	78	56
M.	60	4	33	3	55	75
T.V.	9	14	7	11	78	78
T.S.	37	28	22	21	59	75
T.M.	102	13	67	9	66	69
V.S.	5	4	3	4	60	100
V.M.	4	2	3	0	75	0
S.M.	27	1	17	1	63	100
T.V.S.	8	20	4	17	50	85
T.S.M.	41	4	24	1	59	25
T.V.M.	20	5	18	3	90	60
V.S.M.	—	1	—	1	—	100
T.V.S.M.	7	2	6	1	86	50
Totals ...	372	157	248	115	67	73

TABLE VIII.—*Intrathecal Route, Alone or in Combination.*

T.	25	25	22	21	88	84
T.V.	9	14	7	11	78	79
T.S.	37	28	22	21	59	75
T.M.	102	13	67	9	66	69
T.V.S.	8	20	4	17	50	85
T.S.M.	41	4	24	1	59	25
T.V.M.	20	5	18	3	90	60
T.V.S.M.	7	2	6	1	86	50
Totals ...	249	111	170	84	68	75

TABLE IX.—*Intravenous Route, Alone or in Combination.*

V.		7	4	7	100	100
V.T.	9	14		11	78	79
V.S.	5	4	3	4	60	100
V.M.	4	2	3	0	75	0
V.T.S.	8	20	4	17	50	85
V.T.M.	20	5	18	3	90	60
V.S.M.	—	1	—	1	0	100
V.T.S.M.	7	2	6	1	86	50
Totals ...	57	55	45	44	79	80

TABLE X.—*Subcutaneous Route, Alone or in Combination.*

S.	23	27	18	15	78	55
S.T.	37	28	22	21	59	75
S.V.	5	4	3	4	60	100
S.M.	27	1	17	1	63	100
S.T.V.	8	20	4	17	50	85
S.T.M.	41	4	24	1	59	25
S.V.M.	—	1	—	1	0	100
S.T.V.M.	7	2	6	1	86	50
Totals ...	148	87	94	61	64	70

TABLE XI.—*Intramuscular Route, Alone or in Combination.*

M.	60	4	33	3	55	75
M.T.	102	13	67	9	66	69
M.V.	4	2	3	0	75	0
M.S.	27	1	17	1	63	100
M.T.S.	41	4	24	1	59	25
M.T.V.	20	5	18	3	90	60
M.V.S.	—	1	—	1	0	100
M.T.V.S.	7	2	6	1	86	50
Totals ...	261	32	168	19	64	59

* In Tables VII.-XI. the percentage has been worked out to the nearest whole number.

Effects of the Dosage of Antitoxin Employed by the Several Routes.

Following the methods adopted by our predecessors, we have arranged our records in Tables XII. to XV. in such a

TABLES XII. *to* XV. *show the Cases Treated by each of the Four Methods, either Alone or in Combination with the other Methods, contrasting the Average Amounts of Antitoxin used in the Fatal and Recovery Cases.*

TABLE XII.—*Intrathecal Method.*

Method of administration.	Number of fatal cases.	Average amount used by each route.	Number of recoveries.	Average amount used by each route.	Case mortality.
					Per cent.
T.	22	9,968	3	12,166	88·0
T. V.	7	8,393 8,678	2	15,000 19,250	77·7
T. S.	22	9,920 4,238	15	11,123 22,233	59·4
T. M.	67	11,807 22,294	35	14,240 57,339	65·6
T. V. S.	4	6,125 16,250 8,750	4	25,500 21,875 26,125	50·0
T. V. M.	18	8,000 20,388 22,222	2	6,000 12,450 27,250	90·0
T. S. M.	24	8,410 7,817 20,021	17	16,805 14,138 33,008	58·5
T. V. S. M.	6	13,750 15,666 6,416 12,750	1	6,000 2,000 30,000 54,000	85·7
Totals	170	—	79	—	68·2

TABLE XIII.—*Intravenous Method.*

Method of administration.	Number of fatal cases.	Average amount used by each route.	Number of recoveries.	Average amount used by each route.	Case mortality.
					Per cent.
V.	4	31,625	0	—	100
V. T.	7	8,678 8,393	2	19,250 15,000	77·7
V. S.	3	17,666 4,500	2	9,000 27,500	60·0
V. M.	3	8,000 4,250	1	45,000 30,50	75·0
V. T. S.	4	16,250 6,125 8,750	4	21,875 25,500 28,125	50·0
V. T. M.	18	20,388 8,000 22,222	2	12,450 6,000 27,250	90·0
V. S. M.	—	—	—	—	—
V. T. S. M.	6	15,666 13,750 6,416 12,750	1	2,000 6,000 30,000 54,000	85·7
Totals	45	—	12	—	78·9

TABLE XIV.—*Subcutaneous Method.*

S.	18	21,222	5	48,750	78·2
S. T.	22	4,238 9,920	15	22,233 11,123	59·4
S. V.	3	4,500 17,666	2	27,500 9,000	60·0
S. M.	17	9,870 16,007	10	26,700 37,700	62·9
S. T. V.	4	8,750 6,125 16,250	4	26,125 25,500 21,875	50·0
S. T. M.	24	7,817 8,410 20,021	17	14,138 16,805 33,008	58·5
S. V. M.	—	—	—	—	—
S. T. V. M.	6	6,416 13,750 15,666 12,750	1	30,000 6,000 2,000 54,000	85·7
Totals	94	—	54	—	63·5

TABLE XV.—*Intramuscular Method.*

M.	33	28,972	27	39,914	55·0
M. T.	67	22,294 11,807	35	57,339 14,240	65·6
M. V.	3	4,250 8,000	1	30,750 45,00	75·0
M. S.	17	16,007 9,870	10	37,700 26,700	62·9
M. T. V.	18	22,222 8,000 20,388	2	27,250 6,000 12,450	90·0
M. T. S.	24	20,021 8,410 7,817	17	33,008 16,805 14,138	58·5
M. V. S.	—	—	—	—	—
M. T. V. S.	6	12,750 13,750 15,666 6,416	1	54,000 6,000 2,000 30,000	85·7
Totals	168	—	93	—	64·3

way as to show the full details of every dose given in the 372 cases. The tables thus correspond to similar ones of the previous series, with which they should be compared.

It is not proposed to attempt to analyse these tables in detail. The more the cases are subdivided under secondary headings the smaller the groups become and the less justification do we find for attempting to draw conclusions. On the other hand, taking the records as a whole, the dosage tends to be decidedly larger in cases that recovered than in the fatal cases.

This tendency is perhaps still more clearly seen in Table XVI. where, as in the previous series, the results obtained by each route individually are compared with those obtained by the same route in combination with one or more

TABLE XVI.—*Comparing and Contrasting the Results Obtained by Each Route Individually with those Obtained by that Route in Combination with One or More Others.*

—	Total cases treated.	Average dosage employed.	Died.			Recovered.		
			Number of cases.	Case mortality.	Average dosage.	Number of cases.	Recovery rate.	Average dosage.
		Units.		%	Units.		%	Units.
Intrathecal route only	25	10 232	22	88	9,968	3	12	12,166
Intrathecal cmbd. with other routes.	224	11 742 T.	148	66	10 219 T.	76	34	14,707 T.
Intravenous route only	4	31,625	4	100	31,625	0	0	—
Intravenous cmbd. with other routes.	53	16,709 V.	41	77·3	16 725 V.	12	22·6	16,116 V.
Subcutaneous route only	23	27.206	18	78·2	21,222	5	21·7	48,750
Subcutaneous cmbd with other routes	125	12,578 S.	76	60·8	6,945 S.	49	39·2	21,316 S.
Intramuscular route only	60	33,896	33	55	28,972	27	45	39.914
Intramuscular cmbd. with other routes	201	29 019 M.	135	67·1	12 709 M.	66	32·8	47,228 M.

others. These apparently favourable results, however, require closer examination before they can be interpreted as definite evidence in favour of the value of antitoxin treatment in tetanus.

An obvious source of fallacy, capable of vitiating conclusions drawn from such records, is, that the early intervention of death leads to cessation of treatment and thus diminishes the total amount of serum given, in fatal as compared with favourable cases. In order to eliminate this source of error as far as possible, an attempt has been made to evaluate the effect of serum treatment with regard to the quantity given during the first 48 hours after the appearance of tetanic symptoms. The results are recorded in a total of 215 cases as to which the necessary information was available in our records. These cases are divided into four classes according to their relative severity, under the following headings: I. General Tetanus with Early Trismus. II. General Tetanus with Late Trismus. III. General Tetanus with no Trismus. IV. Local Tetanus. This differentiation, while perhaps rather slender as between Classes I. and II. affords a general idea of the types of case under consideration. It is to be noted that in 28 cases no serum was given during the first 48 hours. The results of this analysis are set forth in Table XVII.

It will be seen in this table that the actual quantity of serum given within the first 48 hours was greater in the fatal cases than in the recovering cases in Classes I. and II., the opposite being the case in Classes III. and IV. The percentage of recoveries was higher amongst the 28 cases receiving no serum treatment within the first 48 hours than amongst either of the other groups. It must not be assumed on this account that the exhibition of anti-tetanic serum during the early stages of the attack is inadvisable. It is much more probable that in some of the 28 cases under consideration the initial symptoms were so slight as to escape recognition, and that these cases recovered because they were of a milder type than the others. This apart, Table XVII. shows clearly the danger of drawing conclusions from a comparison of the dosage throughout the course of fatal cases on the one hand and favourable cases on the other.

A stronger argument in favour of the value of sero-therapy in tetanus is to be found in Table VI., where a steady fall in case mortality is seen to accompany a rise in the average number of antitoxin units given. But here again other factors may be at work, and the gradual improvement in the early treatment of wounds which has developed with a ripened experience in war surgery may well play an important part in decreasing the general severity of tetanus cases.

GENERAL COMMENTARY.

Our analysis of the tetanus case-sheets at our disposal cannot be said to give any very clear indication as to the value of antitoxin treatment in tetanus. A steady fall in case mortality has undoubtedly taken place. Where, however, so many factors may have played a part, the greatest caution should be exercised in attempting to draw definite conclusions as to how this improvement has been brought about. It must be admitted that the employment of antitoxin has, up to the present, failed to produce such a striking improvement as to be at once apparent in statistical records. On the other hand, the dosage has been small.

The union of toxin and antitoxin may be assumed to take place on quantitative lines. Since we are still ignorant of the actual quantity of toxin requiring neutralisation in the average case, we cannot accurately decide whether the dosage of antitoxin hitherto given has or has not been on an adequate scale. On theoretical grounds we are inclined to the opinion that the dosage has not been large enough. It is possible that more striking results would have been obtained had larger doses been resorted to.

A point of more importance than any deduction from documentary records is the fact that the use of tetanus antitoxin is gaining ground amongst those charged with the care of cases. This would appear to indicate that clinical experience is leading to a favourable verdict, although statistical analyses are still inconclusive. It is clear, at least, that no ill-results follow this tendency to increase the dosage, as the mortality has fallen synchronously with it. When serum therapy is employed we are strongly of the opinion that the antitoxin should be given at the earliest possible moment and that it should be given in large doses.

Previous Analyses of Cases of Tetanus arising in the B.E.F.

1. Memorandum on the Treatment of Injuries in War published by the War Office in 1915. 2. An Analysis of Recent Cases of Tetanus in the British Expeditionary Force, with Special Reference to their Treatment by Antitoxin, by Colonel Sir William B. Leishman C.B., F.R.S., and Major A. B. Smallman, D.S.O., THE LANCET, Jan. 27th, 1917.

Analyses of Cases of Tetanus in England.

1. Analysis of Cases Treated in Home Military Hospitals from August, 1914, to August, 1915, by Surgeon-General Sir David Bruce, C.B., F.R.S., Brit. Med. Jour., Oct. 23rd, 1915. 2. An Analysis of Cases of

TABLE XVII.—*Effect of Serum Treatment with Regard to the Size of the Dosage During First 48 Hours after the Appearance of Tetanic Symptoms on Four Classes of the Disease.*

—	Class I.		Class II.		Class III.		Class IV.	
	No. of cases.	Case mortality.	No. of cases.	Case mortality.	No. of cases.	Case mortality.	No. of cases.	Case mortality.
Fatal cases	172	70·8%	53	70·6%	13	56·5%	2	8·8%
Recovered	42		22		10		21	
Cases treated with serum { Fatal ...	98	73·6%	46	71·8%	12	60·0%	2	10·0%
{ Recovered	35		18		8		18	
Cases receiving no serum during first 48 hours ... { Fatal ...	4	36·3%	7	63·6%	1	33·3%	0	Nil.
{ Recovered	7		4		2		3	
Average number of units per case during first 48 hours ... ... {	Died. 14,986	Recovered. 14,175	Died. 16,738	Recovered. 11,847	Died. 21,000	Recovered. 23,212	Died. 11,250	Recovered. 14,527

Tetanus Treated in Home Military Hospitals from August 1st, 1915, to July 31st, 1916 by Surgeon-General Sir David Bruce, C.B., F.R.S., THE LANCET, Dec. 2nd, 1916. 3. An Analysis of Cases of Tetanus Treated in Home Military Hospitals during August, September, and part of October, 1916, by Surgeon-General Sir David Bruce, C.B., F.R.S., THE LANCET, June 30th, 1917. 4. An Analysis of Cases of Tetanus Treated in Home Military Hospitals during part of October, November, and part of December, 1916, by Surgeon-General Sir David Bruce, C.B., F.R.S. THE LANCET, Sept. 15th, 1917. 5 An Analysis of Cases of Tetanus Treated in Home Military Hospitals during part of December, 1916, all January, February, and part of March, 1917, by Surgeon-General Sir David Bruce, C.B., F.R.S., THE LANCET, Dec. 22nd, 1917.

SUMMARY OF SIXTH, SEVENTH, EIGHTH, AND NINTH ANALYSES OF

CASES OF TETANUS TREATED IN HOME MILITARY HOSPITALS

FROM MARCH, 1917, TO APRIL, 1918.

BY SIR DAVID BRUCE, K.C.B., F.R.S., F.R.C.P.,
MAJOR-GENERAL, ARMY MEDICAL SERVICE.

FIVE analyses of cases of tetanus treated in home hospitals have been published in THE LANCET.[1] The four further analyses, each of 100 cases, here summarised cover periods from March to June, 1917, June to September, 1917, September to December, 1917, and December, 1917, to April, 1918.

The Distribution of Cases of Tetanus from August, 1914, to April, 1918.

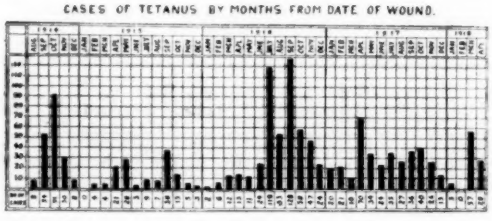
The number of cases of tetanus dealt with in the nine analyses and the rate of mortality are given in Table I.

TABLE I.

Analyses.	No. of cases.	Recovered.	Died.	Mortality.
				%
1914–15	231	98	133	58
1915–16	195	99	96	49
Aug.–Oct., 1916	200	127	73	37
Oct.–Dec., ,, ...	100	69	31	31
Dec., 1916 to March, 1917	100	81	19	19
March–June, 1917... ...	100	71	29	29
June–Sept., ,, ...	100	85	15	15
Sept.–Dec., ,, ...	100	84	16	16
Dec., 1917, to April, 1918	100	76	24	24
Total	1226	790	436	35·5

Diagram 1 merely represents the number of cases of tetanus which have been treated in home military hospitals since the beginning of the war. They are taken from the date of wound, cases from the date of the onset of the disease being shown in Diagram 2. The figures have no relation to the number of wounded or the number of troops engaged. The diagram shows periods of activity and inactivity in the fighting line.

DIAGRAM 1.



The Ratio of the Number of Cases of Tetanus to the Number of Wounded Soldiers.

Diagram 3 represents the ratio of cases of tetanus to the number of wounded soldiers treated in home military hospitals from August, 1914, to April, 1918. They are reckoned from date of wound, not from onset of disease. The abrupt fall in the ratio in November, 1914, is due to the introduction of prophylactic injections of antitoxin, which took place about the middle of October.

DIAGRAM 2.

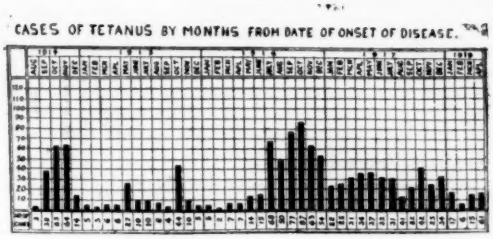
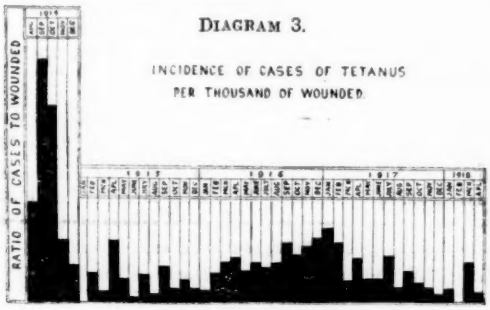


DIAGRAM 3.



Incubation Period.

Table II. shows the relation between percentage mortality rates and incubation period in the various analyses.

TABLE II.

Incubation period.	I.	II.	III.	IV.	V.	VI	VII.	VIII.	IX.
10 days and under	66	82	42	83	40	35	27	23	46
11 to 24 days	39	52	37	30	25	34	29	15	21
25 days and upwards ...	—	27	25	16	14	21	7	13	12

Table III. gives the average length of incubation of cases of tetanus treated in home military hospitals from August, 1914, to April, 1918.

Table IV. gives the number, in percentage of cases, with short, medium, and long incubation periods which have occurred since the beginning of the war to April, 1918.

TABLE III.

Analyses.	No. of cases.	Average incubation
		Days.
1914–15	231	13
1915–16	195	31
Aug.–Oct., 1916...	200	31
Oct.–Dec., ,, ...	100	45
Dec., 1916, to March, 1917	100	67
March–June, 1917	100	44
June–Sept., ,, ...	100	56
Sept.–Dec., ,, ...	100	47
Dec., 1917, to April, 1918	100	47

TABLE IV.

Analyses.	To 10 days.	11 to 22 days.	More than 22 days.
	%	%	%
1914–15	47	46	6
1915–16	16	49	36
Aug.–Oct., 1916...	14	44	42
Oct.–Dec., ,, ...	13	27	61
Dec., 1916, to March, 1917	10	21	69
March–June, 1917	20	34	46
June–Sept., ,, ...	15	24	61
Sept.–Dec., ,, ...	13	31	56
Dec., 1917, to April, 1918	26	29	45

Types of Tetanus: General and Local.

In the first six analyses the proportion of local tetanus to general tetanus was only given. In the seventh, eighth, and ninth analyses a more detailed classification is attempted.

In the sixth analysis there were 80 cases of general and 20 cases of local tetanus with a rate of mortality in the former of 36·2 per cent. There were no deaths among the local cases. In the seventh, eighth, and ninth analyses there were 223 cases of general and 77 cases of local tetanus. The

[1] (1) THE LANCET, Oct. 23rd, 1915; (2) Dec. 2nd, 1916; (3) June 30th, 1917; (4) Sept. 15th, 1917; (5) Dec. 22nd, 1917.

rate of mortality in the former was 25 per cent., in the latter there were no deaths. (Table V.)

TABLE V.

	Cases.	Recovered.	Died.	Mortality per cent.
(*a*) Trismus the earliest symptom—				
1. With complete closure of jaws developing within 24 hours after onset of symptoms ...	17	7	10	59
2. With complete closure of jaws developing after 24 hours...	19	14	5	26
3. With incomplete closure of jaws	111	85	26	23
(*b*) Trismus occurring after other symptoms of tetanus have shown themselves	57	46	11	19
(*c*) General tetanus without trismus	19	16	3	16
(*d*) Local tetanus...	77	77	0	0

Position of Wounds with Reference to Mortality.

Table VI. shows the position of wounds and the mortality rates per cent. in the third to ninth analyses.

TABLE VI.

Position of wounds.	III.	IV.	V.	VI.	VII.	VIII.	IX.
Body	32	37	20	18	18	19	28
Limbs	68	27	17	36	13	13	20

The Effect of Fractures.

Table VII. shows the effect of fractures on the rate of mortality in cases of tetanus in the last four analyses.

TABLE VII.

Wounds.	No of cases.	Recovered.	Died.	Mortality.
Fractures... ...	157	119	38	20·4%
No fractures ...	243	197	46	19·0%

Tetanus Occurring after Operative Treatment of the Wound.

In the four analyses there were 37 cases with 11 deaths, a mortality of 30 per cent. In three cases the prophylactic inoculation of antitetanic serum was reported to have been given before the operation, and in one case the prophylactic injection was only given on the day of the operation.

Prophylactic Treatment of Tetanus by Antitetanic Serum.

Table VIII. shows the rates of mortality per cent. up to April, 1918, in those who received and those who did not receive prophylactic injections.

TABLE VIII.

Prophylactic injections.	1914 to 1915.	1915 to 1916.	Aug.-Oct., 1916.	Oct.-Dec., 1916.	Dec., 1916, to March, 1917.	March-June, 1917.	June-Sept., 1917.	Sept.-Dec., 1917.	Dec., 1917, to April, 1918.
Received	51	43	27	16	18	27	11	16	22
Not recorded ...	41	52	45	41	15	45	33	0	60
None given	63	56	55	65	29	20	57	14	50

TABLE IX.

No. of cases.	Inoculated.	Recovered.	Died.	Mortality.
264	On day of wound.	215	49	18%
62	1 day after wound.	48	14	22%
14	2 days after wound.	12	2	14%
5	3 ,, ,,	4	1	20%
7	4 ,, ,,	5	2	30%
8	More than 4 days after wound.	8	0	0

Table IX gives all the available information in regard to the question what influence, if any, has promptitude in giving these prophylactic injections on the rate of mortality. The figures relate to the sixth, seventh, eighth, and ninth analyses.

On the result obtained from multiple prophylactic injections.—The Tetanus Committee of the War Office have advised that four prophylactic injections should be given to every wounded soldier at intervals of seven days. Table X. represents (for the last four analyses) the rate of mortality of cases of tetanus which have received one to six prophylactic injections.

TABLE X.

No. of inoculations.	No. of cases.	Recovered.	Died.	Mortality.
Received 1	125	94	31	% 25
,, 2	127	103	24	19
,, 3	52	43	9	19
,, 4	38	35	3	8
,, 5	14	13	1	7
,, 6	2		0	0

Table XI. gives the results of none or more inoculations on the period of incubation.

TABLE XI.

No. of inoculations.	6th hundred.		7th hundred.		8th hundred.		9th hundred.	
	No. of cases.	Average incubation period.	No. of cases.	Average incubation period.	No. of cases.	Average incubation period.	No. of cases	Average incubation period.
		days.		days.		days.		days.
0	—	—	—	—	7	83	2	20
1	38	45	36	47	25	28	27	22
2	31	49	31	66	33	30	31	23
3	10	39	15	62	13	62	14	56
4	2	127	5	60	16	70	15	111
5	2	97	2	79	3	94	6	134
6	1	68	1	122	—	—	—	—

Therapeutic or Curative Treatment.

All the 400 cases under review received therapeutic treatment with antitetanic serum. Of these 316 recovered, 84 died, giving a rate of mortality of 21 per cent.

Route of injection.—The Tetanus Committee in their memorandum are of opinion "that in acute general tetanus the best method of treatment lies in the earliest possible administration of large doses of antitoxin by the intrathecal route."

Influence of dosage.—Table XII. shows the influence of dosage on the curative action of antitetanic serum in the 400 cases.

TABLE XII.

(A) Total quantity of antitoxin given during the attack.
(B) Daily quantity of antitoxin given.

Units received.	(A) No. of cases.	(A) Recovered	(A) Died.	(A) Mortality.	(B) No. of cases.	(B) Recovered	(B) Died.	(B) Mortality.
				%				%
1,000 or under	1		0	0	5	5	0	0
1,001 to 5,000	10	10	0	0	70	62	8	11
5,001 ,, 10,000	19	12	7	37	131	120	11	8
10,001 ,, 15,000	23	20	3	13	74	60	14	19
15,001 ,, 20,000	10	9	1	10	46	34	12	26
20,001 ,, 30,000	43	26	17	39	46	21	25	54
30,001 ,, 40,000	47	37	10	21	19	10	9	47
40,001 ,, 60,000	61	41	20	33	7	3	4	57
60,001 ,, 100,000	90	73	17	19	2	1	1	50
100,001 upwards	96	87	9	9				

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL.—Arrangements are being made for the establishment of a country branch for this hospital as well as for the enlargement of the present buildings.

CHRONIC INTESTINAL STASIS:

WHAT ARE THE INDICATIONS FOR OPERATIVE INTERFERENCE?

BY SIR W. ARBUTHNOT LANE, BART., M.S., F.R.C.S.,
CONSULTING SURGEON, GUY'S HOSPITAL, ETC.

IN order to answer this question correctly it is necessary to have a thorough grasp of what intestinal stasis is and of the relative importance of its causal factors and of its end-results. These have been described so fully in previous publications that no repetition is required at the present time I gave a general sketch of the causal factors in my discourse at the Social Evening of the Royal Society of Medicine on Feb. 12th, indicating briefly the origin of intestinal stasis in faulty training of the evacuating mechanism in childhood, the progressive results of loading of the alimentary canal from the lower end upwards, and the relatively little harm produced until stasis reaches as high as the ileo-cæcal valve.

In the vast proportion of cases of intestinal stasis no question of operation arises. The administration of paraffin before meals, the use of a Curtis belt, the assumption of the recumbent posture at intervals, careful dieting, and the employment of such drugs as relieve the symptoms of hyperacidity, &c., will usually afford the patient complete relief.

Operation to Remove Obstruction Caused by Appendix or Ileal Kink.

The next group comprises those cases in which gastro-duodenal distension is clearly due to a damming back of the ileal contents by the pressure exerted by a "controlling appendix" or by an "ileal kink." The interference exerted by these structures may be greater than can be met by the simple treatment just described. Its degree can be determined from the appearance presented by the patient, by the history of the case, from the pain elicited on pressure on the inflamed and hypertrophied end of the ileum, and from the X ray findings.

The utility of a complete report on the passage of a bismuth meal by a competent radiographer who is experienced in this work cannot be exaggerated. It is futile to expect the surgeon to obtain much useful information from a series of radiograms, however good, taken at intervals. By far the most valuable portion of the information afforded by the skilled radiographer is obtained by means of screen work. Unless he is thoroughly familiar with the mechanical conditions which exist in stasis, which he can only learn by observing them frequently at the time of operation, the services of a radiographer are of little value to the surgeon.

Simple treatment having failed in these cases recourse must be had to operation. The removal of the anchored appendix or the freeing of the ileal kink is usually sufficient to liberate the duodeno-jejunal junction from the excessive strain which is responsible for the partial or complete occlusion of its lumen. It is well to remember that the membrane which produces the ileal kink when well developed appears to contain lymphatics and that these lymphatics drain what is always the most infected portion of the ileum. Therefore, after the acquired band has been dealt with by careful separation from the mesentery and by accurate apposition of any torn peritoneal edges, a drainage-tube should be left in for two or three days. This simple precaution may be the means of saving the patient from disaster. One must remember that the kink tends to re-form if the factors which produce it remain in action.

Should the symptoms or the X ray report suggest the presence of any obstruction elsewhere, and especially at the "last kink," it should be operated on at the same time.

Gastro-enterostomy.

The next question to consider is, What are the conditions requiring gastro-enterostomy? When a peptic ulcer is present in the stomach or duodenum, or in both, gastro-enterostomy should be performed, and in the case of gastric ulcer it should be excised, if it seems advisable, or otherwise dealt with to ensure its cure. When the stomach and duodenum are dilated and the latter obstructed by such a degree of kinking at the duodeno-jejunal junction that no freeing of the stasis in the lower bowel is likely to be sufficient to overcome this angulation, and as these constitute antecedent changes in a sequence which ends in peptic ulceration and, finally, in cancer, a gastro-enterostomy should be performed.

Many are satisfied to regard peptic ulcers as primary conditions and to treat them by gastro-enterostomy with or without excision, gastro-enterostomy not being performed unless an ulcer is present. Much thought has been given to the best method of performing this operation, to the form of suture to be used, and to the advisability of occluding the pylorus temporarily or permanently. An ulcer of the stomach or duodenum merely suggests to the mind of the surgeon an operation on the stomach and nothing more. It is obvious that while gastro-enterostomy at once relieves the patient from the mechanical consequences of the obstruction to the duodeno-jejunal junction and from much of the pain and risk which they involve it has no effect whatever on the causal factor—namely, the control of the ileal effluent—while any pre-existing auto-intoxication remains uninfluenced by the surgical procedure.

To limit the operation to establishing a communication between the stomach and jejunum in peptic ulceration is, therefore, obviously unscientific, since the patient derives only partial benefit from it. The end of the ileum should be carefully examined and any obstruction removed, the "last kink" should be dealt with if it is exerting any abnormal control, as is usually the case in these conditions, and any other locality where delay has been shown to exist investigated and treated. To effect this a more extensive incision than is usually made is necessary. A very popular weakness of the surgeon is to do his work through a small opening, and this is largely responsible for his frequent failures to understand the conditions he is dealing with and to benefit his patient. This is well illustrated by what might be called the buttonhole operation for appendicectomy.

By carefully observing the form and functioning of the stomach and duodenum, both radiologically and at the time of the operation, and by gauging the effect of traction on the duodeno-jejunal junction, the surgeon should be able to decide as to whether a gastro-enterostomy is required or whether he should confine himself to dealing with the conditions which are controlling the intestine lower in the tract. How little the mechanical causation of peptic ulcers is understood is illustrated by an operation called gastro-duodenostomy, in which in cases of pyloric obstruction a communication is established between the stomach and a *distended* duodenum, which, as it is distended, must necessarily be obstructed at the duodeno-jejunal junction.

In the case of cholecystitis, with or without gall-stones, in which an operation is required the primary cause of infection in the intestinal canal should be as carefully investigated as in any other end-result of chronic intestinal stasis.

Colectomy.

Finally comes the question, What are the conditions which call for colectomy? In such conditions as extreme constipation in which an evacuation can be obtained only at intervals and with great difficulty and pain; rapid and progressive wasting; mental depression which may be so great at times as to make life intolerable both to the individual and the relations, not infrequently driving the patient to attempt suicide as the only escape from insufferable misery; total inability to lead an active life; a distressing absence of sexual desire leading to constant broils[1]; progressive degenerative changes in the breasts of those with marked family history of cancer, toxic changes in the heart and circulation, and all secondary conditions such as rheumatoid arthritis, Raynaud's disease, Still's disease, many forms of tubercle, Bright's disease, Addison's disease: in these and many other conditions colectomy offers the only hope of cure.

By colectomy I mean the *complete* removal of the large bowel with the exception of a sufficient length of the pelvic colon to establish continuity. About twenty years ago I satisfied myself that the removal of the cæcum, ascending and part of the transverse colon rarely served a useful purpose, since the splenic flexure, last kink, and elongated pelvic colon still continued to control the effluent

Should no complication arise such as the development of adhesions which interfere with the normal functions of

[1] A paper by McCarrison "The Pathogenesis of Deficiency Disease," an abstract of which is published in the British Medical Journal, Feb. 15th, 1919, has an interesting and important bearing on this subject.

the intestine, a condition which may follow any intra-abdominal operation, the health of the patient improves at once in a marvellous manner. Perhaps no alteration is more marked than the change in the mental state of the patient, showing how dependent the functioning of the brain is upon that of the intestine. The most miserable and wretched woman becomes happy, gay, and lively. The other symptoms clear up with remarkable rapidity.

The delay in the small intestine as shown by X rays affords a general indication as to the extent of the surgical interference necessary, but it is well to remember that the degrees of auto-intoxication and of the delay do not necessarily correspond, for the reason that a moderate amount of stasis may be associated with a very virulent infection, while the reverse may be the case. The surgeon must be guided very largely by the severity of the symptoms manifested by the patient. Much must be left to his experience and instinct. A very long pelvic colon associated with much sepsis always calls for colectomy, while a very large, prolapsed, and twisted cæcum can practically be dealt with in no other way. The surgeon will find that he will frequently wish that he had performed a colectomy instead of some lesser operation, but if he had performed a colectomy in the first place he will rarely, if ever, regret that he had done so.

It is difficult, if not impossible, to answer the question forming the title of this paper more definitely than has been done here. The vast majority of colectomies are performed for auto-intoxication and its results and not for the mechanical effects of stasis. In many cases of colitis the only effectual treatment consists in the removal of the large intestine. It is well to remember that in ulcerative colitis the process may extend for a distance up the ileum, and that the ulcerated segment of small intestine should be removed. The pelvic colon is also ulcerated in many cases. This necessitates the subsequent treatment of the residual ulceration by means of vaccines, &c.

The operative treatment of diverticulitis and of cancer of the large bowel calls for no special reference, beyond the statement that in a certain proportion of cases, especially in acute obstruction, it is safer and easier to remove the whole of the large bowel above the pelvic brim than it is a portion of it, while the health of the patient is benefited to a much greater extent by the more extensive operation, and the risk of recurrence is minimised.

Cavendish-square, W.

WHEELHOUSE'S OPERATION:

SOME POINTS WHICH ASSIST IN ITS PERFORMANCE.

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Mr. Wheelhouse first described his operation in 1876.[1] It was designed to deal with strictures through which a filiform bougie could not be passed, yet without retention of urine. Those through which a filiform bougie can be passed are suitable for dilatation or internal urethrotomy. Those associated with retention of urine are best treated by Cock's operation. But for the type under consideration Wheelhouse's operation is generally chosen. Yet it is often a difficult and tedious procedure, and not infrequently has to be supplemented by other methods. In order to surmount this difficulty I am putting forward certain methods which I have adopted in my own practice, and which I believe will be of service to others. The probability of success is increased if Wheelhouse's instructions are closely followed as regards the position at which the urethra should be opened in reference to the stricture—namely, "in the groove of the staff, not upon its point, so as certainly to secure a quarter of an inch of healthy tube immediately in front of the stricture." When the opening in the urethra is held open there is a cone-shaped portion of urethra, leading to the face of the stricture, at the apex of which the orifice of the stricture should be seen. This, however, is the point at which the operation frequently fails. The orifice can neither be seen, nor discovered by means of a probe. It is interesting to read Wheelhouse's original account of the operation, and to contrast it with the difficulties mentioned by subsequent authors.[6,7]

Causes of Difficulty.

The causes of difficulty will now be considered.

1. *Position.*—The position in which the operation is performed is inconvenient. In operations on the perineum it is customary to tilt the buttocks slightly, to bring them nearer to the horizontal, but, broadly speaking, it may be asserted that the wound occupies a vertical position, that such instruments as retractors and pressure forceps occupy the constant attention of an assistant, or will fall into inconvenient positions, whilst hæmorrhage from the wound tends to trickle vertically down the same. The position of the operator is awkward and constrained.

2. *The condition of the opening.*—In the practice of one experienced in the technique of urethral instrumentation only very tight strictures will be submitted to this operation, and many such strictures whose lumen could not be found by the passing of bougies will prove to be undiscoverable even when an attempt is made to pass a filiform or a probe under the direction of the eye. The orifice of numerous glands in the neighbourhood, or the openings of false passages may mislead, whilst the true opening is not infrequently concealed by œdematous granulations.

3. *Hæmorrhage.*—This arises chiefly from the corpus spongiosum, through which the incision passes. This body consists of cavernous tissue. This accounts for the difficulty often experienced in obtaining a dry field for operation, for it is often impossible to ascertain the position of the artery itself unless actually spouting, and to place clamps on the cavernous tissue is obviously futile. Oozing tends to be continuous and very disconcerting to the surgeon. Moreover, it must be remembered that the slightest trickling of blood is sufficient to obscure the opening of the stricture.

These, then, are the factors which, to my mind, make Wheelhouse's operation in many cases a difficult and tedious proceeding.

Procedure if Wheelhouse's Method Fails.

In the event of the operation failing the following possibilities are presented for choice: (1) Dissection of the perineum, in order to find the urethra proximal to the stricture; (2) suprapubic cystotomy and retrograde catheterisation; (3) Cock's operation.

Of these, *Cock's operation* may be summarily dismissed. It was introduced by its author as a method of treatment of cases in which retention is complete—in which, therefore, to use Cock's own words[2]—and these are of the essence of the operation: "the urethra is distended and enlarged between the prostate and the stricture." It is almost certain to fail where the urine can be passed, as in the cases for which Wheelhouse's operation is suitable, and in which, therefore, *there is no* distension of the urethra.

Dissection of the perineum behind the stricture.—The only position in the urethra at which it is necessary to do Wheelhouse's operation is the bulb. The majority of strictures occur in this structure—Thompson gives 67%,[5] Young 70%.[4] If strictures occur in front of this point, Wheelhouse's technique is unnecessary because the urethra is easily found proximal and distal to the stricture.

Fig. 1 shows: 1. That there is a very short length of urethra between the site of the stricture and the triangular

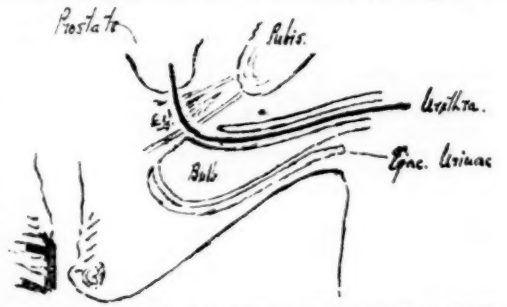

FIG. 1.—Note the amount of bulb lying posterior to the point where the urethra pierces the triangular ligament, the deep position of the bulbous urethra, and its shape. Strictures may occur in close relation to the ligament.

ligament. Sometimes, indeed, the stricture will occur just at the point where the urethra emerges from the triangular ligament. 2. That the urethra makes a bend at this point, so that the direction of that small portion of the urethra which lies between the stricture and the triangular ligament will be at right angles to the direction of the penile urethra, and therefore passing directly away from the surgeon.

These facts account for the trouble which is often experienced in finding the urethra proximal to the stricture, unless

indeed one incises the triangular ligament and searches for it behind that structure. To obviate the difficulty Young[3] has recommended that a more posterior point be sought, as being easier to find. He sets himself therefore, deliberately, from the beginning of the operation to incise the perineal muscles down to the membranous urethra, to cut this and pass a guide from behind forwards to the stricture. This is certainly a deliberate and purposeful operation, but it involves injury to a very important muscle, the compressor urethræ, and a very deep dissection in the perineum.

The awkward position and hæmorrhage continue to annoy the surgeon, and render the dissection difficult in this as in previous stages of the operation.

Suprapubic cystotomy with retrograde catheterisation is an admission of failure to find the proximal urethra, and will only be undertaken if dissection of the perineum fails.

It will be seen that in the event of Wheelhouse's operation failing the advisable recourse is to a dissection of the perineum, but that this may be a difficult procedure.

Suggestions to Rectify the above Difficulties.

To bring the perineum into the true horizontal position and to fix it there steadily is the first necessity. To achieve this I resolved to adopt the Trendelenburg attitude.

When this position is used in operations upon the pelvis the tendency of the body to gravitate to the head end of the table is counteracted in two ways: 1. By the shoulder rests 2. By bending the knees and fastening the legs over the foot end of the table. It is obvious that the second method cannot be used when the perineum is to be operated upon, and further that the shoulders cannot be expected to bear the full weight of the body. If they were called upon to do so a brachial nerve tear would almost certainly result. Some other support had, therefore, to be found, and I resolved to utilise the iliac crests. For this purpose Messrs. Down Bros. have made to my specification a pelvic rest (Fig. 2).

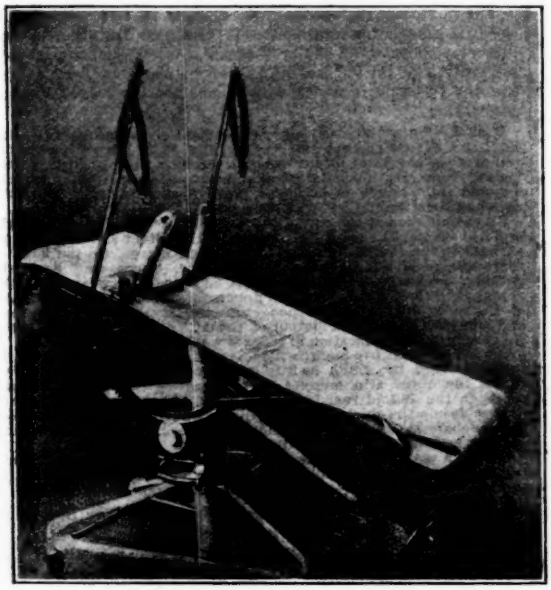

FIG. 2.—Table, showing metal band and uprights in position.

It consists of two curved metal uprights, which are supported by a metal band and slide in slots to accommodate themselves to the breadth of the patient. They are fixed by thumb-screws. The band passes across the table and is rigidly screwed to it. When in use the uprights are adjusted so as to fit the iliac crests closely, a pad of cotton-wool alone intervening. The position on the table is so arranged that the buttocks protrude slightly over the end. When the feet have been fastened to the leg-rests the table may be tilted, the patient being held rigidly in position by the rests. It will be observed (Fig. 3) that the feet are attached to the outer side of the rests in order to render the perineum more accessible.

The advantages which accrue from this position are considerable and various.

1. The surgeon can stand to his work and the usual constrained position gives place to one of comfort.

2. The light falls directly on to the surface of the wound, a very important point.

3. As the operation area is in the horizontal position, instruments can rest on the sides of the incision just as they do around an abdominal wound. The advantages of this are very obvious. Amongst others it frees the assistant's hands for other work than supporting instruments and allows the surgeon to proceed systematically with the operation.

4. The perineum occupies a position higher than that of any other part of the trunk. I have found that the venous sinuses of the pelvis and perineum, including the corpus spongiosum, are thereby emptied, and that bleeding is much less in quantity and easier to control. I should like to lay emphasis on this important point. The field of operation is much drier and easier to work upon.

5. The patient is held very steadily, an item which surgeons themselves will fully appreciate.

6. The assistant obtains a much more direct view of the field of operation.

I have found these advantages to be very real and increase the comfort and facility of the operation very considerably.

The difficulty of finding the proximal urethra I have endeavoured to get over by staining with methylene-blue.

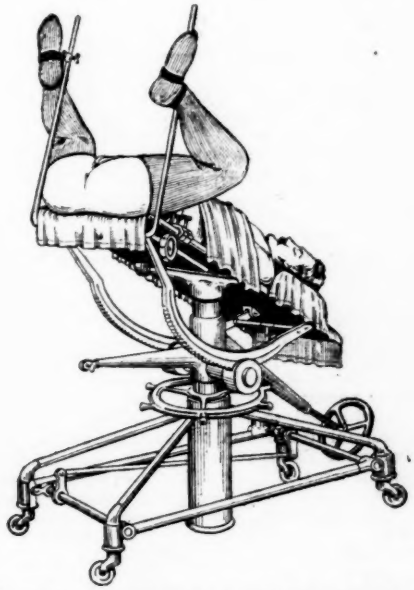

FIG. 3.—Patient in position prior to spreading of towels, &c. In practice it will be found convenient to work with the table more tilted than is indicated.

This is done half an hour previous to the operation. An ordinary urethral syringe is filled with methylene-blue, and the total contents are emptied into the urethra. An average anterior urethra holds about 10 to 12 c.cm., which is the capacity of an urethral syringe. The meatus is compressed with finger and thumb, and the blue is milked back in order to make certain that it has passed the stricture and reached the urethra proximal to the stricture. The patient compresses the meatus for ten minutes to ensure that the urethra is well stained. When he lets it go a certain amount of stain will be expelled. It is well not to stain the passage at too short an interval before operation, as the result would be that when the urethra was opened free liquid methylene-blue would escape into the wound and defeat its purpose. The patient is not allowed to pass urine for one and a half hours before going to the theatre.

By this means I have found that the urethra behind the stricture is much more easily identified, and on several occasions I have been able to trace the course of a sinuous stricture through the surrounding scar. The assistance given saves times and needless damage to the tissue of the bulb by dissection.

I have nothing of interest to say concerning the stages of the operation itself except that I believe I am enabled to do it by more definite and deliberate steps than is usual.

Thus the original incision is deepened till the ejaculator urinæ is reached. The median raphe of this structure is easily observed and the incision now takes advantage of that bloodless line to the extent of about two inches. Each portion of the muscle should now be completely elevated from the bulb, so that the extent of that structure is exposed in the wound. By this means the opportunities of the surgeon for successful orientation are materially increased.

If when the urethra is opened I am not successful in quickly finding the opening into the stricture mouth I do not continue the search, but look for the stained urethra behind the stricture. This is generally more easily found and the operation quickly completed in the usual manner.

The sphere of usefulness of the position which I have represented is not limited to Wheelhouse's operation, but may be extended to many other procedures on the perineum, anus, rectum, vesicles, prostate, &c. I myself have so employed it in a few instances. For two cases especially, in which strictures were excised, I found it invaluable.

I am indebted to Mr. Ghosh, the resident surgical officer at the Salford Royal Hospital, who has kindly prepared the photographs for Figs. 2 and 3.

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Manchester.

GUNSHOT INJURIES OF THE CERVICAL NERVE ROOTS.

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(*Report to the Medical Research Committee.*)

INJURIES of the cervical nerve roots form only a small proportion of peripheral nerve lesions, but their recognition is often difficult as they are liable to be confused with injuries of the brachial plexus or spinal cord.

Although a vast amount of literature has been published during the last four years dealing with the various aspects of gunshot injuries of the brachial plexus, cauda equina, and peripheral nervous system in general, very scanty attention has been directed to lesions of the cervical nerve roots. From a careful study it appears that the pathological changes are somewhat different from those seen in injuries of peripheral nerves in other situations; and it is clear, from observations taken over long periods, that the prognosis is wonderfully good and that surgical interference is not required.

It is most convenient to subdivide the cases into two groups, according as to whether or not there is an associated lesion of the spinal cord.

1. *Injuries of the Cervical Roots Uncomplicated by any Gross Lesion of the Spinal Cord.*

CASE 1.—Patient was wounded March 9th, 1918, the bullet entering immediately below the chin and passing out through the left sterno-mastoid muscles three inches below the mastoid process. There was immediate loss of power in the left upper extremity, but the patient was able to walk back some distance to receive medical attention. Within a week he began to suffer from a burning pain in the thumb. Voluntary power began to return gradually at the wrist and finger-joints in about six weeks.

When examined in July the pain in the thumb was constant and severe, especially when the hand got hot, but there was excellent voluntary movement of the wrist and fingers. The spinati were completely paralysed, and there was only the feeblest voluntary "flicker" in the deltoid, biceps, and brachialis anticus, whilst the triceps and supinator longus were both markedly paretic. No objective sensory disturbance could be found. There was no loss of power or anæsthesia in the lower extremities, and the reflexes were normal, except that the knee-jerk on the left side was more active than on the right.

During the next month the deltoid, biceps, brachialis anticus, triceps, and supinator longus improved considerably, but no evidence of any return of voluntary movement in the spinati was noticed until the latter end of September, by which time all the other muscles mentioned, except the deltoid, had regained practically full power. At this time no difference in the reflexes on the two sides could be found. About this time the pain in the thumb abated considerably, and during the early part of October disappeared.

On examination early in November power was perfectly restored in the biceps, brachialis anticus, and triceps, but the patient was only able to abduct the arm to a right angle. The deltoid and spinati are still improving, and in eight months the functional recovery has been remarkably good.

It is clear that the fifth and sixth roots had suffered chiefly in this patient. The dissociation between the motor and sensory symptoms is of considerable diagnostic value, since implication of the upper trunk of the brachial plexus might have caused a paralysis of similar distribution, but there would almost inevitably have been more profound sensory manifestations. The following report shows a more marked dissociation.

CASE 2.—Patient received a gunshot wound on August 25th, 1918; the missile entered just to the right side of the seventh cervical spine and emerged through the anterior border of the lower half of the right sterno-mastoid muscle. The field medical card stated that the internal jugular vein had been severely lacerated, but no reference was made to any nerve or bone injury. He stated that at the moment he was hit he experienced pain in the right arm, which immediately became "limp and almost useless," but there was no affection of the lower extremities.

He was referred to me about three months after being wounded on account of severe pain in the right arm, which had developed during the last four or five weeks. He complained of a constant dull ache in the thumb and two outer fingers and a severe neuralgic pain down the outer side of the arm and forearm on movement. The limb had fully regained its power, as there was no perceptible weakness of any muscle on comparison with the other side, but the objective sensory manifestations were marked. There was hypoæsthesia and analgesia (to the prick of a pin) of the thumb and two outer fingers and the outer half of the hand, forearm, and arm almost as high as the acromion process. He also complained of what he described as "electric shocks" down the right leg on bending his head forward. The only objective disturbance to be found in the legs was some increase of the right knee-jerk.

In addition to the above symptoms there was also evidence of irritation of the right cervical sympathetic and injury to the right recurrent laryngeal nerve.

The next case differs from the former in two respects: in the first place, the root lesion is bilateral and there is less dissociation between the motor and sensory symptoms; and, secondly, the initial loss of power in the legs, which from the rapid and perfect recovery must have been due to spinal concussion.

CASE 3.—Patient received a gunshot wound of the neck on Oct. 1st, 1917, the missile passing transversely and apparently between the spines of the third and fourth cervical vertebræ without injuring the bones. There was immediate loss of power in all four limbs, but the legs and right arm soon began to improve, and the former had fully regained their normal power in six weeks.

On examination at the end of November it was found that the right arm had recovered except for paresis of the deltoid and slight hypoæsthesia in the distribution of the circumflex nerve. On the left side there was paralysis of the spinati, deltoid, biceps, and brachialis anticus; marked paresis of the triceps, and moderate weakness of the extensors of the wrist, thumb, and fingers, flexor longus pollicis, flexors of the index finger and the thenar muscles, together with anæsthesia and analgesia in the distribution of the fifth and sixth cervical roots. No disability or modification of reflexes was to be found in the legs.

During the next two months the forearm and hand muscles rapidly improved, and by March had fully recovered their normal power, whilst the upper arm muscles were all acting except the spinati, although the deltoid remained very weak. About this time it was noticeable how the objective sensory disturbances on the left side varied, both in character and extent, from week to week. At times a gnawing pain in the thumb was very troublesome.

Within a year from the date of being wounded there was a complete return of function, but some disturbance of the sensibility of the thumb persisted and at times the pain in this region recurred.

II. *Injuries of the Cervical Roots Complicated by Lesions of the Spinal Cord.*

In many of the former group, at the outset, paresis of the legs and slight differences in the deep reflexes on the two sides showed that there had probably been slight spinal complications, but the rapid and perfect recovery demonstrated that concussion was likely to be the cause rather than any gross pathological lesion.

It is not intended in this paper to refer to injuries of nerve roots accompanying severe lacerations of the cord, but only those cases in which the radicular lesions are the obtrusive feature and give rise to the chief disability. In this group I include all cases which give definite and persistent evidence of spinal complication by the presence of objective sensory disturbances or modification of the reflexes. In the first report the injury was localised chiefly to the anterior and posterior roots of the eighth cervical nerve. The difference in the deep reflexes of the legs on the two sides, which persisted, indicated slight implication of the cord, but it was insufficient to cause any serious subjective troubles.

CASE 4.—Patient was wounded on April 24th, 1917, by a rifle bullet, which entered the left sterno-mastoid and came out in the region of the spinous process of the second dorsal vertebra. There was immediate loss of power in the left arm, and some weakness in the left leg was noticed for a few weeks. The left pupil was larger than the right. An X ray report stated that there was "an injury to the eighth [*sic*] cervical vertebra."

On examination in October, 1917, the leg had completely recovered, the pupils were equal, and the left upper arm had regained full power. There was paralysis of the flexor profundus digitorum, interossei, lumbricales, and hypothenar muscles, with paresis of the flexor carpi ulnaris, adductor pollicis and the thenar muscles. In addition hypoæsthesia but no analgesia of the little finger and ulnar border of the

hand was found. The left knee-jerk was exaggerated, but there was no clonus or sensory loss in either leg, and the plantar response was flexor in type on both sides.

During the next six months there was some improvement in function owing to better flexion of the fingers, the lumbricales and flexor profundus digitorum to the index recovering and the paretic muscles gaining strength. When discharged the hand was very serviceable, but there was still paralysis of the interossei and hypothenar muscles. The exaggeration of the left knee-jerk also remained.

During the seven months he was under observation the most striking feature was the almost daily variation in the objective sensory disturbances in the left hand. The hypoæsthesia was constant and persisted throughout, but from time to time it was accompanied by analgesia or hypalgesia to the prick of a pin, with occasionally thermal anæsthesia to water at 0° C. Heat was always well appreciated.

CASE 5.—Patient received a gunshot wound on June 24th, 1915; the bullet entered one inch above the inner end of the right clavicle and came out opposite the spine of the seventh cervical vertebra. An X ray examination revealed an injury to the transverse process of the seventh cervical vertebra and the fragment was subsequently excised. Immediately on being injured there was complete loss of power in all four limbs.

The left leg began to improve in two or three weeks and had practically recovered in two months, whilst the left arm began to recover in two months and steadily progressed, so that in about seven or eight months it was merely a little weak, and "went numb" in cold weather.

The right arm did not show any improvement until May, 1916, but after that time steady progress was maintained. Recovery in the right leg was first noticed about three months after being wounded, and continued for over a year.

I first saw the patient in December, 1917, when he had been discharged from the Army for almost 12 months and had neglected treatment. All the fingers of the right hand were tightly contracted into the palm, and there was paralysis and wasting of the flexor carpi ulnaris and all the small muscles of the hand, together with anæsthesia and analgesia in the greater part of the distribution of the eighth cervical and first dorsal roots. He claimed to be able to walk about half a mile, and could certainly get about easily without support, in spite of obvious weakness of the right lower limb; the deep reflexes of the right leg were exaggerated, and ankle clonus and an extensor plantar response were found also on this side.

The left arm and leg had recovered full power and range of movement. The left leg and left half of the trunk, as high as the level of the fourth dorsal segment, showed complete analgesia and thermoanæsthesia of spinal origin. No sensory disturbance of any form was discovered on testing the right leg or left arm.

With treatment considerable improvement has occurred in the right arm, but the motor and sensory condition due to the spinal lesion have remained stationary.

When seen last, in November, 1918, all the muscles of the right upper extremity showed voluntary contraction, but considerable disablement resulted from a severe contracture of the flexor profundus digitorum, which has resisted all forms of treatment. The sensory loss in this limb was then confined to the two inner fingers and ulnar border of the hand. No disability could be found in the left arm, but the patient stated that the hand went weak and the inner border of the hand and forearm numb in cold weather.

The clinical history in the above suggests an injury to the lower cervical roots, complicated by a unilateral lesion (possibly hæmatomyelia) in the right lateral column of the cord.

A similar root injury has been seen recently accompanied apparently by a hæmorrhage into the posterior column of one side, since the leg exhibiting marked alteration of the reflexes also showed loss of the postural sense, but unfortunately the patient was only seen once and it was not possible to follow the progress.

CASE 6.—Patient was wounded on Sept. 20th, 1917, by a machine-gun bullet, which entered just to the right side of the first dorsal spinous process and emerged under the left lower border of the mandible.

In a report on the examination at the base two days later it is stated that the muscles of the left arm were flaccid, except for the trapezius, and there was considerable weakness of the right arm. On the left side there was anæsthesia in the distribution of the fifth, sixth, seventh, and eighth cervical roots, whilst on the right there was hypoæsthesia in the sixth and seventh cervical areas only. The left pupil was about half the size of the right. The motor power, sensation, and reflexes in both legs are recorded as normal.

By Oct. 20th there was some return of power in the muscles of the left upper arm and shoulder and the flexors and extensors of the wrist, with considerable reduction in the sensory loss and less inequality in size of the pupils.

During the early part of November he began to be troubled by weakness of the legs, especially the left, although up to that time he had been walking about freely without discomfort and no difference in the reflexes on the two sides had been found. Examination of the legs at this time failed to reveal any obvious difference in power or tone on the two sides, but the left knee-jerk was considerably exaggerated, and there was an extensor plantar response on this side. Some analgesia of the distal part of the right lower extremity was found, but sensation was normal on the left side.

During the next month the leg condition remained stationary and then began to improve slowly, so that by January, 1918, he was able to walk two or three miles although the altered reflexes remained. By this time the right arm had shown great improvement, there remaining merely some weakness of the hand-grasp; on the left all the muscles were now acting voluntarily, but there was still marked paresis of the shoulder and upper arm muscles and flexors of the fingers. The objective sensory disturbance was now negligible.

During the next two months improvement was maintained in both the legs and arms, but the left leg was still apt to give way after walking two or three miles. The difference in the knee-jerks on the two sides was marked and an extensor plantar response was still elicited on the left.

On discharge in May (eight months after the injury) the right arm had fully recovered, but the patient maintained that its power was apt to vary, the left arm had regained full strength except for slight paresis of the flexors of the fingers. No objective sensory disturbance could be found, but the left leg still became weak on fatigue.

Pathology.

The most significant feature of the last case is the development of a disability of the legs during the latter part of the second month of convalescence. A similar complication was observed to develop at exactly the same time (seventh week after injury) in another patient with a lesion of the cervical nerve roots. The late appearance of this manifestation suggests that it cannot be due to any primary hæmorrhage into the cord, but rather involvement from without—such as meningeal adhesions following organisation of a hæmorrhage around the cord.

The persistence of unilateral exaggeration of the deep reflexes in Case 4 may be due to the same cause, but in that case it is interesting to notice that the plantar reflex was of the flexor type throughout.

The etiology of the leg disability in Case 5 is not likely to be the same. In the latter paraplegia was present from the first and only slowly improved, compared with the rapid recovery in Cases 1, 2, and 3 (where the spinal trouble was probably concussion), unilateral ankle clonus and an extensor plantar response persisted, and there was clinical evidence of interference with the spinothalamic bundle, as well as the pyramidal tract, shown by the loss of pain and thermal sensibility in the contralateral leg. The pathological lesion which seems most likely to cause such clinical signs is a small hæmorrhage into the cord, it being most improbable that laceration by the missile could give rise to such well-localised symptoms. It is quite conceivable from recorded observations that the divulsive force of a bullet, as it passes in the vicinity of the spinal canal, could result in rupture of the small vessels in the cord.

Therefore, it appears likely that the symptoms of spinal cord complications in gunshot injuries of the nerve roots may be due to the following causes:—

1. *Concussion* in which recovery is rapid and complete.
2. *Meningeal adhesions* which will only give rise to clinical symptoms during convalescence, and usually in the latter part of the second month. Complications from this source may arise in a patient who has recovered from concussion or who has not previously shown any evidence of spinal complications.
3. *Hæmatomyelia* characterised from the time of the injury by definite evidence of a lesion of the spinal cord, which does not materially improve. From personal experience the hæmorrhage appears to be most frequently unilateral and situated in either the posterior or lateral columns, but two cases have been seen recently in which the lesion appeared to affect the posterior columns on both sides.
4. *Laceration* in which the cord lesion is so severe that the radicular injury becomes of quite secondary importance.

It is not quite so easy to decide upon the character of the injury to the nerve roots. At first the loss of conduction is usually profound and affects several roots, but from the rapid improvement it is clear that this must be due very largely to concussion. From a study of the course of the bullet it appears improbable, in most cases, that the missile could possibly have lacerated any root fibres in its course. In Case 3 the bullet passed transversely behind the vertebræ, and apparently between the third and fourth cervical spines, without injuring bone. In those cases where the roots are actually lacerated the concomitant injury to the cord is much more serious, and a high proportion of these injuries are probably fatal owing to laceration of the carotid or jugular vessels.

The frequency of bilateral root lesions, without serious injury of the cord, further supports the contention that serious laceration by the missile is rare in the patients under discussion. Injury to the nerve roots by fragments of bone can be responsible for only a small proportion, since X ray examinations only revealed bone injuries in about 16 per cent., and in a fair proportion of these the injury was so situated that it could not possibly implicate the nerve roots.

Therefore it seems possible that the loss of conduction, other than that due to concussion, in a large proportion is due to hæmorrhage around the nerve roots from the numerous small vessels chiefly in the pia mater. This is supported by the striking variation from day to day, which has been referred to in several of the reports, in the objective sensory

symptoms. This variation is characteristic of compression and is only seen at a time when the hæmorrhage will have been replaced by fibrous tissue, which is liable to contract upon the nerve roots.

The late development of spinal symptoms, which I suggest are due to meningeal adhesions, is in agreement with this contention. The hæmorrhage from pial vessels is scarcely likely to be sufficient to cause compression of the cord, and it is only after sufficient time has elapsed for it to become organised that the symptoms make their appearance. The marked recovery indicates that the compression is rarely sufficiently severe to cause any serious destruction of fibres.

Diagnosis.

The segmental distribution of both sensory and motor symptoms is most helpful in diagnosing a radicular from a spinal injury. The absence of any alteration of reflexes or sensory disturbance below the site of the injury is further evidence against any spinal injury, but in so many root lesions there is some disturbance of conduction in the spinal cord also. A localised hæmorrhage into the grey matter might cause a lower motor lesion of more or less segmental distribution, but, instead of being accompanied by loss of sensation in the corresponding sensory segment of the same limb, would most probably be associated with altered reflexes on the leg of the same side. According to the size and position of the hæmorrhage there might also be sensory disturbances in the lower limbs, but these would show a different arrangement and dissociation from those due to lesions of peripheral nerves.

The differential diagnosis from brachial plexus lesions is often difficult. Signs of concomitant loss of conduction in the cord, even if only due to concussion, would be in favour of a root injury. The segmental distribution of symptoms is helpful in distinguishing from an injury of the lower part of the plexus, but of less service in differentiating from an injury of the trunks, which would also give segmental symptoms. In the latter difficulty, help may be obtained often from the greater and more frequent dissociation between sensory and motor symptoms in radicular lesions.

In some the decision is exceedingly difficult, and I have seen one patient in whom the brachial plexus was exposed in error right up to the intervertebral foramina with, of course, negative results. The clinical condition at the time of operation warranted the diagnosis of an incomplete division of the upper trunk of the plexus, but an inquiry into the history would have suggested the probability of the correct anatomical localisation.

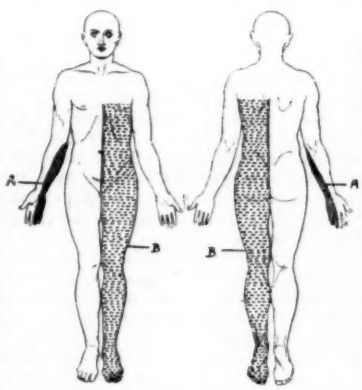
When suspicious of a root injury the presence of slight increase of the reflexes of the lower limb on the same side is of great diagnostic value.

Treatment.

From a survey of these reports it is apparent that the ultimate recovery is most striking, considering the great initial incapacity. It is necessary to consider the treatment of the radicular and spinal lesions separately.

Radicular injury.

The affected limb or limbs must be supported at the earliest possible moment, so that all paralysed or paretic mucles are relaxed. This is particularly important in lesions of the fifth and sixth cervical roots, since failure to support the deltoid and spinati in the early stages causes irreparable damage to the muscles, which will delay and limit recovery and render contracture of antagonistic muscles probable. At the outset, when the whole limb requires support, no appliance can compare with an abduction splint fitted with suitable forearm attachment, which can be modified slightly to meet the special requirements of the patient, to support the muscles acting on the wrist, fingers, and thumb.



The objective sensory disturbance in Case 5. A, Of peripheral origin. B, Of central origin.

Of almost equal importance is daily passive movement of all joints to prevent mechanical limitation of mobility from contractures and arthritic adhesions. Persistent immobilisation at this time frequently gives rise to disabilities which last longer than those due to the nerve lesion directly, and in themselves may cause permanent incapacitation (Case 5). Beyond this little is required except daily massage of the whole limb to maintain general nutrition of the muscles as far as possible. With the earliest return of voluntary movement careful muscle training may be commenced, but care must be taken at first not to fatigue the recovering muscles. If the muscles have been well supported from an early date and daily mobilisation practised wonderfully good results can be induced by the skilful and persistent methods of muscle training.

The principles underlying the correct performance of this form of treatment have recently been most elaborately explained by Mackenzie.[1] The support of the muscles must not be dispensed with too early, not until a fair range of voluntary movement has returned, and even then it is preferable that the splint should be worn at night for a time.

In the later stages employment, suitable for further development of the recovering muscles, may be undertaken.

Spinal lesion.—In the type of case to which this paper refers the spinal lesion rarely causes any very serious trouble. The little spasticity which may be experienced can generally be relieved by massage and only infrequently persists. If it provided serious disability at a late stage and showed no signs of improvement, rhizotomy might have to be considered. The weakness in the legs usually improves with graduated exercises, and most patients have been able to walk two to three miles without discomfort.

The treatment of the *scar* has also to be considered, since it may restrict seriously the mobility of the neck. Ionisation and manipulation will generally loosen it sufficiently to prevent any serious limitation of movement, but in some the extent and character of the cicatrix may necessitate its excision.

[1] Mackenzie, C.: The Action of Muscles.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF ERYTHRÆMIA.

BY MARGARET H. FRASER, M.B., B.S. LOND.,
PHYSICIAN, SOUTH LONDON HOSPITAL FOR WOMEN.

THE following case was shown at a meeting held recently of the London Association of Medical Women.

The patient, a married woman, aged 60, had for many years noticed some blueness of the face and hands during cold weather and occasional epistaxis, but it was only after the death of her son 18 months ago that she observed swelling of the abdomen and other symptoms—e.g., frontal headache, a feeling of fullness in the head, pain in the upper abdomen, and some loss of flesh. When admitted to the South London Hospital for Women in February, 1918, there was congestion and cyanosis of the skin of the face, ears, and neck, the mucous membrane of the mouth and tongue was purplish in colour, and the conjunctivæ were injected. Discolouration of the forearms and hands was present and some dilatation of the veins of the legs. The arteries were thickened, the blood pressure measured 128 mm. Hg; the heart was normal. A blood examination gave the following result: Red blood cells, 9,510,000 per c.mm.; white blood cells, 30,000; hæmoglobin, 130 per cent.; colour index, 0·7. A differential count gave per cent.: polymorphonuclear cells, 86·8; lymphocytes, 8·6; hyaline cells, 1·4; eosinophil cells, 1·5. No abnormal cells were seen. The liver was enlarged, the edge being palpable 3 inches below the costal margin in the mid-clavicular line. The spleen formed a hard, somewhat nodular mass in the left hypochondrium, extending to the level of the umbilicus. The urine contained a trace of albumin; the specific gravity was 1013 to

1018. The urea excretion was fairly good, and there was no evidence of organic kidney disease.

The case was treated with calomel and saline aperients and a somewhat restricted diet. X ray treatment was applied to the spleen. Venesection was not done. The subjective symptoms had now to a great extent disappeared. The liver was smaller and the spleen, though not much changed in size, felt less hard. The abdominal pain was relieved by a belt, and the patient was now living an ordinary life with little discomfort. The last blood count showed 8,000,000 red blood cells and 13,000 white cells.

TWO CASES OF DISLOCATION OF TEETH.

BY H. MEARNS SAVERY, M.R.C.S. ENG., L.R.C.P. LOND.,
LATE C.S.O., IPSWICH HOSPITAL.

THE following cases may be of general interest, as I have not been able to find any literature on the subject, nor have I heard of similar treatment being adopted in the same circumstances.

CASE 1.—A lad of about 13 years received an accidental blow in the mouth from a stick. I found that his two upper centrals had been completely dislocated, hanging loose in the mouth, and falling into my hand on being touched. Considerable laceration of the soft parts and loosening of adjacent teeth. The teeth were not broken in any way, so having placed them in saline I cleansed the parts, removing all blood clots from the cavities, and using flavine (1-1000). The two teeth were then replaced, the lacerations of the gum necessitating a few points of silk suture. The patient was furnished with a lint pad to bite on and the jaw held up fairly tightly by a jaw bandage. Fluid diet only was allowed. Pad and bandage were kept on for 48 hours, ensuing treatment consisting in fluid diet and thorough cleansing of the teeth and mouth twice daily with swabs soaked in flavine (1-1000). In five or six days the solid diet was gradually given.

Six months later I found the condition quite satisfactory. For some time the patient had been able to bite apples and tackle hard crusts with no discomfort.

CASE 2.—A youth, 18 years, was kicked in the mouth while playing football. The first and second bicuspid and first molar teeth of the right upper jaw were turned almost upside down, the crowns being forced up and separating an appreciable portion of the alveolar margin. I did not take away the teeth, there being a considerable attachment of gum. The parts were cleansed as in Case 1. Here the restoration of the "bite" was more difficult owing to the destruction in the continuity of the alveolar margin. After considerable manipulation this was accomplished and after-treatment instituted as in Case 1. I discharged this patient some time afterwards. The only fault in an otherwise perfect result was that two of the teeth were a fraction lower than previously, but this caused no inconvenience.

I am anxious to know if replacement of teeth is commonly carried out. It seems a pity that permanent teeth should be lost, as seems to happen so often in young people as the result of accident, if there is any chance, and there appears to be, that they might be saved.

Budleigh Salterton, S. Devon.

INTRAVENOUS INJECTION OF POTASSIUM IODIDE IN TABES DORSALIS.

BY F. J. DEVOTA,
SENIOR DRESSER, STATE HOSPITAL, KOTA BHARU, KELANTAN.

THE following case is of special interest as regards the beneficial effects of treatment by intravenous injection of potassium iodide in tabes dorsalis:—

An Indian, aged 41, working as a railway guard in the F.M.S. Ry. stationed at Pasir Mas, Kelantan section, was admitted into the State hospital, Kota Bharu, Kelantan, for treatment on April 27th, 1918. For the past three weeks he had been troubled with occasional shooting pains in the legs. He gave a history of gonorrhœa at the age of 27 and of having had a chancre when he was 37. On examination he was found to be suffering from many symptoms pointing to tabes dorsalis—e.g., pain in the limbs, loss of knee-jerks and ankle-jerks, loss of pupil light reflex, shooting pains in the lower extremities and also anæsthesia of the feet and lower part of the legs; the patient could hardly walk.

On April 29th and May 6th and 13th the patient was given a full dose of "914," but no improvement was noticed, and he complained of very severe shooting pains in the legs and feet, especially at night-time; these pains were partially controlled by morphia. After three intravenous injections of potassium iodide (gr. 30 dissolved in 4 oz. of normal saline solution) improvement followed and the patient was discharged from the hospital on May 31st.

This patient was last seen by me on July 5th, working on the railway line, and I was informed by the patient himself that the shooting pains in the legs and feet had entirely disappeared ever since he was discharged from the hospital.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OTOLOGY.

A MEETING of this section was held on Feb. 21st, Mr. HUGH E. JONES, the President, being in the chair.

Radical and Modified Radical Mastoid Operations.

Mr. J. S. FRASER and Mr. W. T. GARRETSON (Edinburgh) contributed a paper on "Radical and Modified Radical Mastoid Operations: their Indications, Technique, and Results." In the absence of the authors, the paper was read by Dr. DAN MCKENZIE. The contribution was based on the analysis of 306 cases of chronic middle-ear suppuration, composed as follows: 238 radical mastoid operation, 17 modified radical mastoid operation, 26 labyrinthitis, 25 intracranial complications. The average age of the patients was 20 years. The most common causes appeared to be scarlet fever and measles. Sometimes the aural discharge had been attributed to a blow on the ear. In only 66 cases did the patients or their relatives remember the cause of the ear trouble. Among the precursory illnesses were: measles in 26, scarlet fever in 25, pneumonia 3, whooping-cough 1, mumps 1, small-pox 1, teething 2, cold 1, injury 6. Middle-ear suppuration the authors found to be much more common among the poor than among the better-to-do. If the cases of severe suppurative otitis media were properly treated when they arose there would be very little chronic middle-ear suppuration, and consequently the radical mastoid operation would seldom be called for. The public authorities had, however, turned a deaf ear so far to the remonstrances of otologists in the matter. In 1913 the International Medical Congress passed a resolution in these terms:—

"That it would be greatly to the advantage of the community if experts in otology and laryngology were attached to the special hospitals for the treatment of epidemic diseases."

The duration of the condition, according to the statements of the patients, varied from 5 months to 20 or 30 years. In only 48 cases was cholesteatoma diagnosed before operation, though at the operation it was found in 104. There was Eustachian obstruction in 34; in 70 cases the membrane showed results of chronic suppurative otitis media. In many of the cases there were more than one indication for operation present. In 33 cases there was chronic suppurative otitis media and failure of the conservative treatment; in 93 chronic suppurative otitis media with polypi or granulations was present, and in 57 chronic suppurative otitis media with pain, mastoid tenderness, and polypi. In 208 cases the mastoid cortex was found to be normal. Particulars of the 238 cases in which the radical mastoid operation was performed (the average stay of the patients in hospital was 22 days) were briefly given as follows:—Mortality: all cases, 5·3 per cent.; of uncomplicated cases, 0·7 per cent. Findings at operation: mastoid process sclerotic, 174; sclerotic diploë, 31; diploetic, 12; cellular, 8. Cholesteatoma present in 104. Results: non-grafted (178 examined), 43 per cent. cured; grafted (70 examined), 70 per cent. cured. Hearing after operation: non-grafted: improved, 39 per cent.; unchanged, 39 per cent.; worse, 23 per cent. Grafted: improved, 29 per cent.; unchanged, 30 per cent.; worse, 38 per cent. Modified mastoid operation: 9 satisfactory, 3 had moist cavities, 10 had improved hearing, 2 had hearing unaltered, and 1 had worse hearing.

Discussion.

Mr. ARTHUR CHEATLE regarded the paper as a masterpiece in its way. He again urged the appointment of otologists to fever hospitals. The Government were warned in 1902 of the loss of man-power which had resulted from ear troubles, and the experience of the war had brought home the truth of what was then urged. Pensions would have to be paid for many years owing to cases of ear disease which might have been prevented. He recommended the appointment of a Standing Committee of six to watch the Public Health Bill. About 5 to 7 per cent. of candidates for the Royal Air Force had to be turned down on account of chronic middle-ear suppuration. In 1902 he examined many school children and found that 88 out of 1000 had chronic middle-ear suppuration. He considered that the cases in which the modified or incomplete

mastoid operation was justifiable were very few and far between, and for acute and subacute inflammation of the middle ear he regarded the incomplete operation as bad and unscientific; in some cases the Schwartze operation had to be performed after all.

Dr. J. KERR LOVE said there appeared to be a tendency to operate on all cases of chronic middle-ear suppuration. He had always under care about 500 school children with chronic middle-ear suppuration, and he could count on recovery without operation in more than half the cases. He curetted the naso-pharynx and removed enlarged tonsils, and then subjected the external auditory canal and middle ear to careful treatment over a considerable period. He did the modified operation more readily in cases in which both ears were involved, unless the evidence very strongly favoured the radical operation. He believed operation had been unnecessarily done in many of these cases.

What Operation should be Performed?

Mr. CHARLES J. HEATH said he assumed Dr. Love did not perform the radical operation when both ears were involved because the modified operation was likely to secure retention of a more reasonable amount of hearing than was the Schwartze operation. On his, the speaker's, recommendation the Metropolitan Asylums Board had set up a hospital in London where all the children under their control who had ear discharge were sent. If, after a few weeks' treatment, the running did not cease they were operated upon by the conservative method. The ear dressing at the hospital was not a distressing procedure. In reply to a question, he said he had not published a summary of his results.

Dr. WILLIAM HILL did not believe all the operations done on the children under the Metropolitan Asylums Board were necessary, nor that the best form of operation for their trouble was selected. The meeting should let it be clearly understood that the specialty did not regard the Schwartze operation as obsolete, but considered it to be a good operation for acute and subacute cases. By the so-called conservative operation—that of Küster, revived by Charles Heath—he contended that the balance of the ear as a whole was altered, and it was exposing the ear to vicissitudes of climate, to draughts, and the entry of water. There was a strong line of difference in this matter. Was Mr. Heath right, or were the majority of otologists right? The matter needed thrashing out.

Mr. W. STUART-LOW pleaded for a better education of the general practitioner on the dangers of the later results of fugitive otitis media, which would lead to cases being sent to the otologist early. Attention to tonsils and adenoids would mostly prevent the onset of otitis. He considered that the radical mastoid operation should never be done on children. It was very sad to contemplate deafness as a sequel to the operation. He discussed the technique, and uttered a warning against tight bandaging.

Dr. J. DUNDAS GRANT said that very seldom was a Schwartze operation done for acute suppuration of the middle ear in which the patient did not get perfectly well; therefore he contended it was unnecessary to perform an operation which left a chronic fistula. If a fistula were left after a Schwartze, it would be called a very bad operation. He could not help feeling that Mr. Heath's teaching was responsible for some of the ear work which had been done on soldiers. He protested against the charge that the radical mastoid operation (the Schwartze) produced deafness, as it was an unfair statement. When the anterior part of the tympanum was shut off from the aditus and antrum, the modified operation, he agreed, was very strongly indicated; and he thought the results in cases shown by Mr. Heath to-day were admirable.

Mr. SOMERVILLE HASTINGS said in many of his Schwartze operations a sinus was left. He therefore tried the modified operation, and in his hands the operation had given admirable results in acute and subacute cases, healing occurring quicker also, and the dressing was easier and more satisfactory. He had now largely given up the Schwartze operation, especially for children. For chronic cases he did the Schwartze always.

When should a Bone Operation be Done?

Sir CHARLES A. BALLANCE suggested that the essential question in the discussion was, When should an operation on the bone be done? There were fulminating cases of acute otitis media in which the mastoid process was rapidly involved, the cells becoming filled with pus after three or four days. Those required operation; wherever pus was present it must be let out. He thought there was nothing better than the Schwartze for those. If adequately and thoroughly performed in such cases it left perfect hearing, and healing occurred in a short time. He was interested to return, after a long absence, to find attempts still being made to improve the older methods. He was against the idea of carrying out any rigid operation as planned in the books; every operator should be prepared to vary it in such a way as to deal most effectively with what he found present. He insisted on the importance of absolute and free drainage of the tympanum. The tympanum should be interfered with as little as possible.

Dr. MCKENZIE briefly replied for the authors.

Septic Infection of Lateral Sinus after Injury at Operation.

Mr. HUNTER TOD read a paper entitled "Septic Infection of Lateral Sinus Accidentally Injured during the Operation of Mastoidotomy." The author included only those cases in which the mastoid operation was performed for chronic suppurative disease of the middle-ear cleft and mastoid cells, and in which, at the time of the operation, the sinus was apparently healthy. Septic infection of the sinus after injury rarely took place. These injuries were divisible into two groups: 1. A clean cut through the wall of the sinus, with profuse hæmorrhage, requiring obliteration of the lumen of the sinus. In these cases he had never observed subsequent infection of the sinus. 2. Grazing of the outer layer or puncturing of the sinus wall with no bleeding or with only slight oozing of blood for a moment or two, the injury being so slight as to escape notice unless a careful examination be made at the time of the operation. He gave details of six cases, four in his own practice, with one death. In the fatal case all seemed to be going well until the eighth day, when the patient had a rigor and the temperature rose to 103° F. Mr. Tod operated again on the ninth day, performing ligation of the internal jugular vein. Perforation of the sinus wall was discovered and a septic clot was removed. The autopsy showed septic thrombus and pus in the circular and both cavernous sinuses, extending into both ophthalmic veins. Mr. Tod's conclusions were as follows. Whenever the lateral sinus was exposed during the mastoid operation, careful examination should be made to see if it had been injured, even slightly. If so, it should be exposed freely on each side and its lumen obliterated by packing with gauze well beyond the affected area. There might be no evidence of infection of the sinus until the ninth day or later; a sudden rigor might be the first symptom. This, with an increased pulse-rate, should be regarded as a danger signal. If hæmorrhage occurred from the mastoid wound a few days after operation, it was not sufficient to arrest the hæmorrhage by applying pressure to the bleeding spot; the bone should be removed from the sinus wall above and below the affected area, and a gauze plug inserted between the bone and the outer wall of the sinus. Hæmorrhage associated with pyrexia or a rigor always meant septic infection, and in the latter case the internal jugular should always be ligated.

The paper was discussed by Dr. MCKENZIE, Mr. H. J. BANKS DAVIS, Mr. STUART-LOW, Mr. W. M. MOLLISON, Mr. HEATH, and the PRESIDENT, and Mr. TOD briefly replied.

LITERARY INTELLIGENCE.—A third edition of "Diseases of the Skin," by Dr. J. H. Sequeira, physician to the skin department and lecturer on dermatology at the London Hospital, is ready for publication in the hands of Messrs. J. and A. Churchill. It is illustrated by 52 plates in colour and 257 text-figures.

ABERDEEN ROYAL INFIRMARY: STAFF APPOINTMENTS.—The vacancies on the staff of the Aberdeen Royal Infirmary occasioned by the resignation of Dr. J. Scott Riddell and the death of Dr. A. H. Lister, the filling of the latter post having been postponed during the war, have been filled by the appointment of Dr. Fred. K. Smith, the senior assistant surgeon, to the office of surgeon, and Dr. Thomas Fraser, the senior assistant physician, to the post of physician. The vacancy occurring through the resignation of Dr. W. Sinclair, the late superintendent, has been filled by the appointment of Miss Edmondson, the matron, who has performed the duties during the last three years, to the joint office of superintendent and matron.

FRENCH SUPPLEMENT TO THE LANCET

Under the Editorial Direction of

Professor CHARLES ACHARD, PROFESSOR OF PATHOLOGY AND THERAPEUTICS IN THE UNIVERSITY OF PARIS.

AND

Dr. CHARLES FLANDIN, D.S.O., MÉDECIN-MAJOR DE 2ME CLASSE; CHEF DE CLINIQUE À LA FACULTÉ DE PARIS.

THE SURGICAL COMPLICATIONS FOLLOWING EXANTHEMATIC TYPHUS.

BY DR. PAUL MOURE AND DR. ETIENNE SORREL,

PROSECTORS TO THE FACULTY OF MEDICINE, PARIS; MÉDECINS AIDE-MAJORS DE 1. CLASSE; SURGEONS TO THE FRENCH HOSPITAL AT JASSY.

THE surgical complications following typhus or relapsing fever generally supervene at the end of the febrile period or at the commencement of convalescence. The patients are at the time in a state of feebleness, which predisposes them to the development of secondary infections.

Micro-organisms, agents of these secondary infections, can easily find a door of entry, in order to penetrate into an organism already profoundly enfeebled. On the one hand, bedsores over the sacrum, buttocks, or trochanters frequently offer them free access; on the other hand, the bucco-pharyngeal mucosa, dry and ulcerated as it is at the height of the fever, is a constant focus of infection.

These facts lead us to understand how nearly all the surgical complications which we have had to treat among convalescents from exanthematic typhus and relapsing fever have only been, so to say, the indirect result of these two affections, their direct cause being the organisms of super-infection, ordinary micro-organisms such as staphylococci, and especially streptococci. Never in the suppurative complications following relapsing fever have we recovered from the pus the spirillum, the pathogenic agent so easily discovered in blood films. When the still unknown organism of typhus is discovered it should, of course, be sought for in the infected tissues and in the pus from abscesses, but we can say in advance that most of the suppurative complications observed by us during the epidemic of 1917 in Roumania were due to the streptococcus. Danielopol, who during this epidemic made numerous blood examinations, was able by blood culture very frequently to find the streptococcus in the blood of typhus patients at the height of the disease, or at the beginning of convalescence, proving thus that many typhus convalescents are, in fact, suffering from more or less latent streptococcal septicæmia.

On the other hand, blood cultures carried out in the laboratory of Professor Cantacuzène by Dr. Jonnesco, and in the laboratory of Professor Slatineanu by Dr. Nasta, were nearly always negative.

However this may be, the typhus patient who reaches the end of the recurrent febrile period of his illness, lasting from 12 to 16 days, is again exposed, and this in a considerable proportion of cases, to the development of secondary infections likely to end fatally.

These patients, who are, in fact, septicæmic, may present all the localisations and all the forms of metastatic abscess. Nevertheless, the serious localisations have been in our experience rare, and we can classify as follows the surgical complications following exanthematic typhus with which we have had most frequently to deal: (1) Bucco-pharyngeal complications; (2) auricular and mastoid complications; (3) parotid infections; (4) laryngeal complications; (5) ocular complications; (6) large subcutaneous abscesses; (7) gangrene; (8) erysipelas.

I. *Bucco-pharyngeal Complications.*

Infection of the bucco-pharyngeal cavity, for which the way is opened by the dryness and ulceration of the mucosa existing at the height of the disease, may serve as a point of departure for general infection without there being any demonstrable local lesions, but the local infection often develops on its own account, determining a series of complications, such as gingivitis, osteitis, necrosis of the jaw, and suppurative inflammation of the cervical glands.

Gingivitis has been frequent because, in view of the number of patients and the difficulties of hospital organisation which only came into being at the moment of retreat, most of the patients could not receive the small attentions necessary for severely febrile cases. Simple gingivitis was the most frequent form, but it was not unusual to see *periostitis* develop with loss of several teeth or *necrosis* of the jaw. Looking at the gravity of the general symptoms and the state of prostration, the localised gingivitis naturally turned one's thoughts to scurvy, but although some typhoid cases were identified at this time in our patients who had a suspicious gingivitis, we were unable to show the presence either of petechiæ, ecchymoses, or the characteristic muscular induration.

In one case we observed *total necrosis* of the mandible in a patient who was admitted moribund to one of our wards. The mandible could, without anæsthesia, be removed in two pieces after division in the middle. All the muscular attachments and ligaments had been destroyed by suppuration, and the bone was only held by a few fibres at the level of the temporo-maxillary articulation. The specimen was presented to the Medico-Chirurgical Society of Jassy.

The gum infection, periosteal or osseous, which attacked especially the mandible, spread sometimes to the cellular spaces and cervical glands; we were able to observe all the forms—fulminating, acute, subacute, and chronic (generally the two latter)—of suppurative and non-suppurative cervical adenitis.

One rather peculiar fact is the frequence with which we have seen tuberculous *adenitis* develop. It seems as if relapsing fever specially predisposes to inflammation of the lympho-glandular apparatus. But, faced with the simultaneous occurrence of exanthematic typhus and relapsing fever, it was often difficult to apportion the part played by each of these affections. Most of the cervical adenitis, whether uni- or bilateral, involved the sub-maxillary or carotid glands, sometimes affecting simultaneously all the glandular chains of the neck and mediastinum. Among these cases of adenitis, some, by their slow development, their localisation, and the mobility of the glands, justified surgical extirpation with ultimate excellent results; others, by their rapidity, extent, and quick diffusion, rendered all surgical intervention impracticable.

In certain cases we observed in the glands of the neck mixed infections, a secondary infection with streptococci or staphylococci becoming superimposed on the tuberculous lesion already healed. This gave rise to a subacute adenitis, the glands suppurating and breaking down, leaving permanent fistulæ after incision or spontaneous discharge. Moreover, it was not uncommon to see such subjects carried off rapidly after some weeks by pulmonary or a terminal miliary tuberculosis. In one case we found chains of streptococci in films made from pus contained in the glands excised with the knife, while a guinea-pig became infected with tuberculosis after inoculation with a fragment of these same glands, the microscopic appearance of which left no doubt of their tuberculous nature.

By the side of this cervical adenitis, which is the most frequent, we have observed axillary and inguinal adenitis, singly or in combination or alone, the prognosis of which is generally more hopeful.

II. *Auricular and Mastoid Complications.*

The bucco-naso-pharyngitis, which occurs so frequently in typhus convalescents, readily explains the large number of cases of otitis media and mastoiditis which we have had to treat.

Otitis media generally supervenes at the height of the disease or at the beginning of convalescence. If its commencement is sometimes ushered in by pain of an acute character preceding by some days the ear discharge, little or no pain is more often noted, the otorrhœa appearing as the first symptom of the complication. The otitis media of usual onset is sometimes unilateral, but more often bilateral; it is generally accompanied by a slight rise of temperature, after which the discharge appears. The pus, at first serous, becomes purulent, and contains the streptococcus alone or associated with other organisms. Treated by ordinary

means, these middle-ear inflammations generally tend to heal, but some leave sequelæ, becoming chronic or complicated by mastoid infection.

Mastoiditis following exanthematic typhus also shows this peculiar characteristic of developing generally in a sluggish form. This explains why patients generally came to us at a late period of their lesion. The latency, intelligible enough when the complication supervenes in very prostrate subjects, appears more curious when the convalescent's general condition is less precarious or when he even seems definitely cured. A certain number of our patients have thus come first to consult us many days or even weeks after having left the typhus hospital. They then complained either of ear discharge, which alarmed by its quantity or persistence, or of a swelling behind the ear presenting the obvious features of a subcutaneous abscess of mastoid origin. This latency of subjective symptoms was in contrast with the frequent extent of the anatomical lesion. Often the infection involved all the mastoid cells from base to tip. Pus came to light under the skin behind the ear or spread downwards towards the neck, along the sheath of the sterno-mastoid or the posterior belly of the digastric. One of our patients had a large deep abscess in the temporal region following mastoiditis with caries of the wall of the auditory meatus. The lesion led us to make a large petro-mastoid resection through a pre-auricular incision, the patient making a perfect recovery after radical cure.

In one patient suffering from otitis media with abundant discharge a swelling appeared behind the angle of the jaw, at the same time as the aural discharge diminished. This swelling, the size of a nut, and inconvenient rather than painful, caused limitation of the movement of rotation of the head and slight trismus. The diagnosis lay between a subacute adenitis and mastoiditis with cervical abscess. The first hypothesis appeared the most reasonable, inasmuch as pressure over the region of the antrum produced no pain at all. An exploratory incision showed a perforation of the tip of the mastoid process, which was then cleaned out completely, as it proved to be filled with granulations from the tip to the base, and extending to the external wall of the lateral sinus.

This sluggish behaviour sometimes masked lesions of considerable extent, and tending to complications involving the brain. In one patient suffering from fungous mastoiditis with sequestrums, an abscess of the temporal lobe of the brain was discovered and emptied. The lesion, which appeared at first to improve, caused death from encephalitis with hernia of the brain two months after operation.

Most of these cases of mastoiditis with clinically slow and subacute onset were found to be fungating mastoiditis; examination of the granulations revealing nearly always the presence of the streptococcus with or without other organisms. But the pus removed at the time of operation has never shown more than a small number of micro-organisms, generally one to three in a field.

In the *treatment* of these cases of mastoiditis we have always employed the classic method, trephining the antrum and scraping out the mastoid process, guided by the lesions and under the control of the frontal mirror. After curetting all the affected parts, the retro-auricular wound is closed with horse-hair and a Carrel's tube introduced into the antrum The next few days the mastoid cavity thus closed is irrigated with Dakin's solution according to Carrel's method, and a regular count of micro-organisms made. In most cases (save those complicated by brain lesions) a rapid disinfection of the operation cavity resulted and complete cicatrisation followed which, in 70 per cent. of the cases, did not occupy more than 25 days.[1] The prognosis in these post-typhus mastoiditis cases was generally good, provided that surgical intervention was early enough to anticipate the more deadly brain complications.

III. *Parotid Infections.*

Post-typhus parotitis has a similar origin to that occurring in other prolonged febrile diseases, but this complication is, in exanthematic typhus, particularly frequent. It is favoured by the arrest of the parotid secretion during the febrile period, leading to dryness of the mouth and rapid bacterial multiplication. The onset occurs at the end of the acute period, sometimes in advanced convalescence. We have seen all forms of parotitis, from simple parotid inflammation on one or both sides without suppuration to actual gangrene. The most frequent forms were the suppurative and the gangrenous.

As a rule patients evacuated from a distance reached us with much delay and with suppuration fully developed; we rarely saw the beginning of the complication. Suppurative parotitis showed its text-book characters. Generally spontaneous liberation of the contents occurred, sometimes through the skin, but more often into the auditory meatus. Otoscopic examination demonstrated swelling on the anterior surface of the canal, with a fistulous orifice situated at the junction of the cartilaginous and bony portions. Pressure on the gland caused pus to exude from this orifice. Examination of the buccal cavity showed a dry mouth, with sordes and mucous excoriations, the orifice of Stenon's canal showing red.

The *course* of suppurative parotitis was generally long and grave. After incision, if intervention had been early, the swollen parotid wound allowed serous discharge to flow away for some 48 hours, after which frank suppuration was established and persisted for a long while whatever the treatment adopted. For two, three, or five weeks the operation wound could be seen suppurating, but slow recovery generally took place.

The *gangrenous* forms were not exceptional, but their gravity was considerable. It seems, moreover, that the form of the actual parotitis stood in some relation to the general condition of the patients; those with the worst attacks presenting the grave forms of parotitis. In gangrenous parotitis, most often bilateral, complete elimination of the gland and neighbouring cellular tissue was noted in the form of yellowish pulp and shreds. The skin, red and œdematous, sloughed round the incision, which was sometimes the point of origin of erysipelas. In one of our patients a true phlegmon of both parotid regions developed, with considerable œdema of the face and ulceration of the external carotid which occurred during a dressing. Pressure forceps were applied and left *in situ*, and after large incisions on both sides and drainage of the subparotid spaces complete recovery fortunately occurred.

When the parotitis showed a tendency to heal after long and profuse suppuration, the wound, which for long had appeared atonic, resumed a healthy red colour and began to granulate. The cavity, often enormous, opening up the whole bed of the parotid, filled up, and complete cicatrisation occurred. In the many cases we had to treat neither facial paralysis nor salivary fistula was ever noted.

The *treatment* employed was always a curved incision over the angle of the jaw under local anæsthesia or after a few whiffs of ethyl chloride. The incision was followed by opening up the gland with the curette, in order to remove at once a large part of the dead tissue, the gradual elimination of which was found to retard healing. Irrigation of the operation cavity with Dakin's solution rendered equally good service.

The pus from these parotid inflammations contained streptococci, sometimes alone, sometimes with other micro-organisms, but we were not able to identify the cocci and bacilli seen in the films of pus. It is nevertheless probable that the gangrenous forms of parotitis resulted from the association of streptococci and anaerobes, a fact recently demonstrated in the case of gunshot wounds.

IV. *Laryngeal Complications.*

In regard to the larynx,[2] two kinds of complications were noted—the one early and occurring at the height of the disease, true *laryngo-typhus;* the other a late complication, a sequel to lesions of the submucosa and cartilages, determining stenosis of the larynx.

Laryngo-typhus occurs with the text-book characters, analogous to that which supervenes in the course of typhoid fever. We saw a typical case in which the laryngeal localisation was the first symptom of the malady, preceding the characteristic rash the appearance of which some days later allowed the diagnosis to be made. The patient died suddenly one night from a crisis of suffocation, some days after the appearance of the rash.

Laryngeal stenosis following exanthematic typhus is fairly frequent. These cicatricial lesions of the larynx probably follow localised secondary infections of the laryngeal cartilages.

[1] A memoir on this subject appears in the Revue hebdomadaire de laryngologie, otologie, rhinologie de Bordeaux, No. 20, 1917.

[2] See on this subject "La Pathologie de guerre du larynx et de la trachée." By Moure, Liebault, Canuyt. Paris: Félix Alcan

In the first instance a laryngeal chondritis is met with, there is a general suppurative condition, with intra- and extra-laryngeal abscesses, and consecutive fistulæ. When the patient has not been carried off either by the general attack or by local complications, particularly of respiratory type, a progressive cicatricial stenosis of the larynx takes place. Generally the clinical phenomena succeed each other in the following chronological order: The typhus patient presents either at the beginning or at the height of the disease signs of laryngitis, which are but the exaggeration of the usual enanthem, which generally accompanies the exanthem in a marked form; later the laryngeal phenomena increase in intensity, the larynx becomes painful, and there is complete aphonia. Laryngoscopic examination reveals œdema and a wide infiltration of the laryngeal mucosa, the ventricular bands covering and concealing the vocal cords. Soon respiratory troubles appear which necessitate tracheotomy. The lesions may be arrested at this stage, but generally the cartilages are attacked by the infection, and chondritis and perichondritis lead on to suppuration; the laryngeal region becomes painful, red, hot, and œdematous; abscesses form which discharge spontaneously or are evacuated surgically. Suppuration persists for a long time with elimination of the cartilages, after which, little by little, the inflammatory symptoms die down, the fistulæ dry up after many weeks, and when the cannula comes to be removed it is found that the patient cannot breathe or breathes very badly through the larynx. One is in the presence of a "canulard." With our friend Dr. Costiniu, chief of the special centre at Jassy, we saw a number of such cases. The only rational treatment to apply to these canulards is laryngostomy with dilatation of the larynx.

V. *Ocular Complications.*

The ocular complications of typhus have been recently treated of by Dantrelle in an excellent thesis, the conclusions of which we transcribe:—

Exanthematic typhus may produce complications of two kinds. The first group includes complications at the height of the disease, due to the malady itself, localised in the visual apparatus. In this group are included: Lesions of the iris and lens; lesions of the choroid and retina; lesions of the optic nerve and central vessels; ocular paralyses. From their appearance these lesions are probably of vascular origin, which is in accordance with the other manifestations and with the morbid anatomy of the disease. They are of grave consequence to the vision, and treatment is often powerless against them.

The second group, more important numerically, is constituted by complications which supervene during the first days of convalescence. Following sometimes on simple erysipelas, they are due to the streptococcus. In this group are included palpebral abscess, phlegmon of the orbit, corneal ulcers, and optic atrophy secondary to streptococcal infection.

We have ourselves seen abscesses of the eyelids, especially if the upper, and phlegmon of the orbit in patients who had other lesions necessitating continued care in a general surgical ward. We might mention, among others, the case of a patient who presented simultaneously two large abscesses of the thigh and of the thoracic wall, a phlegmon of the orbit of the right side, and an abscess of the left upper eyelid. The course was naturally fatal.

VI. *Large Subcutaneous Abscesses; Phlegmon of the Limbs.*

Very frequently in patients recovering from typhus we have seen large subcutaneous abscesses. Their occurrence is generally late, progressive, and almost silent, and this latency is extremely remarkable, the patient generally calling no attention to their presence until an advanced stage. The large subcutaneous abscesses are situated most usually on the external surface of the thigh or the posterior surface of the arm, but they are not unusual on the calf, the anterior or posterior thoracic wall, and even in the abdominal parietes.

The pathology of these abscesses is multifarious. Sometimes they are the result of septic punctures, inasmuch as the grave general state of these typhus patients demands numerous injections of substances such as oil of camphor. But although a lapse in asepsis may possibly sometimes explain the formation of such abscesses it must not be forgotten that the patients are suffering from streptococcal septicæmia; and it is reasonable to assume—Danielopol insists on this point—that large doses of oil of camphor, injected and absorbed, as they are, very slowly, play the part of fixation abscess, the streptococcus being nearly always recoverable from the pus of the abscess. Finally, abscesses are often seen to develop at the sites of old punctures.

The clinical course of these abscesses is slow, this being one of their most typical characteristics. They come thus to acquire enormous dimensions, forming large fluctuating pockets under the skin, occupying, for instance, the whole length of the thigh and separating two-thirds of the integument. On their surface the skin, slightly raised it may be generally appears normal, without redness, without heat, without pain, without œdema. Palpation gives a true sensation of fluctuation, because the pus, being under little or no pressure in the large sac which it does not distend, is easily displaced. It is not unusual to see successive pockets communicating by narrow orifices, which permit fluid to be pressed from one into the other.

When one of these large abscesses is opened a quantity, often considerable, of thick, greenish-yellow pus flows away under very slight pressure. It is then observed that the walls of the cavity are formed on the surface by the skin, in the depth by the aponeuresis, the surfaces of which are hidden by sanious débris of cellular tissue. At an earlier stage, a smaller quantity of pus may be found, but instead a true areolar infiltration of subcutaneous tissue, forming an infinite number of little purulent foci which later become joined into one by destruction of the connecting fibres.

Examination of pus films reveals numerous polynuclears, more or less destroyed according to the age of the lesion, a large proportion of macrophages and, nearly always, chains of streptococci. Generally these large abscesses are subaponeurotic, and we have seen much more rarely total phlegmon of a limb; the latter is generally of fatal prognosis. The large superficial abscesses develop progressively, and, if not treated, reach considerable proportions. Generally, after surgical opening they recover perfectly.

Treatment is simple. Dehelly and Zislin have published on this subject communications read before the Medical Society of Jassy. It is necessary under local or general anæsthesia to open completely the purulent sac. But it is not sufficient to evacuate the pus and to drain as for an ordinary abscess. Such a practice is followed by interminable suppuration. It is necessary, after opening the sac, to evert the edges and energetically to curette the walls, in order to clear from them the granulation tissue and all the detritus of adherent connective tissue. Then, according to circumstances, the wound may, following the practice of Dehelly and Zislin, be left widely open and irrigated with Dakin's solution; with secondary closure after disinfection has been obtained, or immediate partial closure may be performed, Carrel's tubes being left in to irrigate the partially closed cavity. These two procedures have both given us excellent results. But it is not exceptional to see, even after extensive and complete operation, the infection spread upwards and downwards, necessitating new incisions.

It must be added that these streptococcal abscesses are particularly difficult to disinfect, and in a certain number of cases we have had to leave them to cicatrise spontaneously without any attempt at secondary suture.

VII. *Gangrene.*

Of all complications following exanthematic typhus gangrene seems to be the only one which can rightly be credited to the still unknown pathogenic agent of this infection; no absolute proof of this assumption can be furnished so long as this infecting agent has not been recovered from the wall of the obliterated arteries, or from the clot contained in them.

Gangrene due to *obliterative arteritis* is relatively frequent in the course of epidemics of typhus, and we have seen it in a large number of cases; but here the variety of adjuvant causes which we have found as the basis of other complications must be taken into consideration. Of these gangrenes three classes may be distinguished.

The first includes *gangrene localised to the points of pressure*, which leads to confusion with bed-sores.

The second includes *gangrene of the lower limbs*, and particularly of the feet, the pathology of which is still somewhat in doubt, inasmuch as it is difficult to decide the effect exerted on the arteries by the typhus infection, by secondary infections and by a third adjuvant cause—the cold. We are convinced that much of the gangrene of the feet sent to us

as a complication of typhus was nothing more than frost bite, supervening in convalescents who during a rigorous winter had to travel far, insufficiently clothed, in unheated trains or on trucks, and along roads covered with snow.

A third class includes *gangrene localised to one part of the body*, generally attacking the integument only, but affecting also the muscles and deeper tissues. One particularly frequent localisation is the scrotum; gangrene may attack it at one localised point, or may invade the entire scrotum, threatening the testicles. On the thorax, the trunk, or the arms, small patches of necrosis were seen, sharply localised and coexisting with marbling, a very characteristic combination. Granted the affinity of the still unknown germ of typhus for the vascular system, these lesions might well be thought to belong to the typhus infection. The course was generally simple; the marbling disappeared steadily and the small necrosed patches were cast off, leaving more or less deep ulcers which cicatrised progressively.

Bed-sores, which were extremely frequent, possessed no special features. Their number, extent, and depth are an indication of the more or less precarious state of the subject.

Gangrene of the limbs is seen nearly exclusively in the lower extremities. We have received nearly all such patients at an advanced period and in a state of dry gangrene. Most often the gangrene involved the toes, fairly often the ankle, and sometimes spread upwards to the middle part of the leg. The general condition was always very precarious, the lesion presented all the characters of dry gangrene, the necrosed parts were black, hard, separated from the healthy parts by a line of demarcation. The patient, emaciated, shrivelled, often moribund in appearance, sometimes complained of pain of a neuralgic character; the temperature was generally subnormal, oscillating around 36° C. Throughout the time of our stay at Jassy we had to treat a considerable number of cases of gangrene and came to the conclusion that surgical measures should be as conservative and cautious as possible, avoiding every routine and text-book operative measure, particularly the cutting of flaps, which generally led to disaster or to bad functional results. On the one hand, the patients were in a state of equilibrium so unstable that it was impossible for them to undergo a serious operation, and, on the other, the tissues were so deeply infected, even beyond the apparent lesions, that the bistoury might always reveal infections of extreme gravity. We therefore adopted the following technique. When patients suffering from gangrene of the lower limbs arrived the gangrenous part was covered for some days with antiseptic wrappings of formol, alcohol, or Dakin's solution, and, first and foremost, we set ourselves to build up the general condition with good food, injections of serum, of sparteine, of adrenalin, and the like. Then often without the need of an anæsthetic, the necrosed parts were cut off just below the line of demarcation in such a way as not to result in bleeding. Thus relieved of the focus of septic absorption the cut edges of the amputations were irrigated for several days by means of Carrel's tubes. Generally the state of the patient improved progressively; we were then able at a second operation, under light narcosis or spinal anæsthesia, to set the stump in order. But here again the greatest prudence was necessary. The actual operation often led to a lighting up of grave microbic infection, because these foci nearly always still contained streptococci. For the toes, we contented ourselves, after circular incision of the integument just at the level of the lesion, with dividing the bone with the chisel about a centimetre or so above the skin incision, which led sometimes to the subjacent articulation. The result was a series of small circular stumps which cicatrised slowly after suppurating for some time, for it was necessary to abstain from any form of suture. When the lesion involved the ankle the technique was the same and just as conservative. Excellent functional results were obtained by practising simple transverse amputations of the foot without troubling about lines of articulation, and, above all, without cutting flaps, which are bound to suppurate, or often to slough, and which involve much greater sacrifice of tissue.

On the other hand, during long expectant treatment we often saw lower limbs recover which presented total gangrene of the ankle and islets of a superficial gangrene spreading up the heel and even on to the leg, accompanied by redness, lymphangitis, and œdema. A rapid operation, without counting its gravity, necessitated a large and useless excision, for having sacrificed only the actually necrosed parts, the alarming symptoms were seen to pass off, the integument took on a normal appearance, and the islets of superficial gangrene progressively cicatrised. It was thus possible to practise secondarily very conservative operations on the ankle, when one might have been tempted to sacrifice the leg by intervening too soon.

VIII. *Erysipelas.*

To the surgical complications just mentioned erysipelas must be added. Its frequency, known since Murchison and Trousseau as a complication of typhus, is easy to understand, seeing the almost constant presence of the streptococcus in typhus convalescents. Danielopol reported 9 cases among 200 typhus patients.

Its localisation was variable. In some cases it supervened spontaneously, and was then situated on the face, sometimes associated with lymphangitic abscesses. In others—and this fact has struck us particularly—it supervened after surgical intervention, such as incision of the parotid or of phlegmons, but especially after operations designed to adjust the stumps left after gangrene of the lower limbs. As a result of the incision a veritable inoculation occurred whatever antiseptic precautions were taken, and after an incubation period of 3–5 days a typical erysipelas developed which impaired the patient's outlook.

Conclusions.

Most of the surgical complications following exanthematic typhus observed during the epidemic of 1917 in Roumania were suppurative complications due to the micro-organisms of secondary infections, and particularly to the streptococcus.

Streptococcal septicæmia—the point of origin is the bed-sore or the bucco-pharyngeal ulcer—explains all the suppurative localisations which we have had to treat. It seems desirable to make an exception in the case of gangrene, where the obliterative arteritis is possibly due to the still unknown germs of the disease.

The clinical course of all these complications is generally subacute or chronic.

The prognosis is very often grave; this is due less to the local complication than to the seriousness of the general condition and to the exhaustion of the patient. Indeed, most of our typhus convalescents, having reached the extreme limit of physiological resistance and being exhausted by successive illnesses, died from lack of the power to resist a trifling infection.

The treatment must envisage the general condition and the local complication. *A first main point is to avoid secondary infection by preventive treatment. For this it is necessary during the acute period of the disease and during convalescence to carry out careful hygiene of the skin and of the food and air passages.*

The *general treatment* often surpasses local treatment. It is necessary to struggle against the condition of physical exhaustion and of extreme physiological want by means of good food, injections of serum, adrenalin, and the like.

The *local treatment* varies with the particular localisation, it must be carried out in stages, regulated before all by the condition of the patient. General anæsthesia must be avoided as much as possible; when it is necessary it must be brief and cautious.

In the case of suppurative collections, after evacuation of the pus and curetting of the focus in order to eliminate the necrosed tissues we have often employed discontinuous irrigation with Dakin's solution according to Carrel's method, and we have seen operation wounds thus become sterile; we have even gone on to secondary suture, in spite of the presence of the streptococcus. Possibly certain varieties of streptococcus were less virulent, as the attenuation of the general symptoms suggested; perhaps the patients, who were often septicæmic, had acquired a certain degree of immunity. This immunity might, moreover, be accentuated by the employment of antistreptococcic serum.

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THE LANCET.

LONDON: SATURDAY, MARCH 1, 1919.

The Medical Profession and the Trade-Union Question.

A MEETING, following an invitation extended to the medical profession in the metropolitan area, was held on Sunday last at the Wigmore Hall. The meeting was convened by the Council of the Medico-Political Union with the object of passing a resolution for the organisation of the medical profession on a trade-union basis, and such a resolution was carried by a large majority at a gathering whose sentiments on the subject were obvious, and many of whom were committed already to the programme. The time at the disposal of the meeting was largely occupied by statements made in behalf of the resolution, and, though a hearing was given to certain dissentient voices, the very brief period which the chairman was able to allot to each speaker prevented the presentation in any adequate shape of arguments directed against the manifest views of the bulk of the audience: but even so, the majority voters owed a proportion of their preponderating strength to the argumentative, rattling, but reasoned address of Dr. E. H. M. STANCOMB, who came up from Southampton to explain to a London audience how his provincial experience ought to hold good for his metropolitan brethren. We suggest, however, with no idea of belittling the sound sense of his words as a whole or of minimising the force of his main arguments, that in a truly representative audience he would not have escaped some fundamental criticism.

Dr. STANCOMB, speaking, we believe, for the Council of the Medico-Political Union—and seldom were any of his statements or deductions received with dissent in the hall—developed his arguments along familiar lines, and, indeed, referred to the fact that he had made already scores of addresses similar to the one he was delivering. Premising that the medical profession in all attempts to bargain with the State had got the worst of the negotiations, he asserted that the lack of political force among medical men was due to the fact that the politician, necessarily a party man, was not attacked at his only vulnerable spots—viz., party-interest and self-interest. He pointed to the success which had attended the methods of the great trade-unions as a proof that Governments would listen to the organised voice of trade, but paid no attention to arguments or protests presented in any other way. Admitting that the last weapon of the trade-unions had been the strike, he disavowed any intention on the part of the Medico-Political Union to employ such a weapon except in the long last, when, moreover, in no circumstances would it be used against the sick, but only against Government regulations, concerning which a fair hearing had been refused to accredited medical representatives. The first step, therefore, must be to obtain for the medical profession such accredited representation, when it would follow, or ought to follow, that any bargain entered into with Government by such an accredited body must be adhered to in spirit and detail, unless and until both parties to the bargain were agreeable to variation. The assumption, at this point of the address, was that a medical trade-union could be formed, and be generally accredited; and while the particular audience at the Wigmore Hall seemed to regard the assumption as a perfectly safe one, they cannot in this particular have been representative of the whole medical profession. Dr. STANCOMB dealt in an ingenious way with the allegation that the medical profession would have difficulty in forming an effective trade-union, having regard to the fact that it could not have either the numerical force or the mass influence of the great trade-unions whose influence upon modern legislation has been so marked. He denied that a medical trade-union would be an impotent affair, and, on the contrary, was apprehensive even of the power that would thus be obtained, because a medical trade-union would be, from the very nature of the vocation concerned, protected from the weakness caused by blacklegging. This, of course, is true in the main, for, as a medical man receives five years of intensive study at the expense to himself of £1000 before he can acquire the legal right to practise, substitutes for him cannot possibly be found outside his own ranks. But for this very reason does the trade combination within his own ranks require to be held together by a unanimity that can hardly be hoped for. If all those holding the necessary medical qualifications declined to carry out regulations which they consider to be unfair until their arguments had been properly attended to and their grievances, if proven, had been adjusted, there would be no possibility of any other class taking their place either temporarily or permanently. Thus an effective strike would ensue. But those who follow the profession of medicine have not always the simple issues before them that confront the boiler-maker. The inadequate pay of our calling is generally felt, and there would be the general impulse to combine and to cohere after combination, but more than such an impulse would be necessary to consolidate the working of a medical trade-union.

A trade-union cannot succeed unless it represents substantially a union of those employed in the trade. We are perfectly aware that many trade-unions have within their fold dissentient and substantial minorities, but for practical purposes the members have a common policy which can be easily translated into political activity. The common policy of the medical profession is to benefit the human race, and how to translate this into political activity is in theory and practice, principle and detail, the eternal striving of all good citizens as well as of all medical men. That policy is in existence, is working daily with more force, and now that a Ministry of Health is actually born is the time for speeding its activities. It is, indeed, the

accepted time, because never was the public more ready to back the medical profession than now, and never was there a better chance of obtaining public assistance for the persuasion or coercion of politicians. Victory in the war has been obtained primarily by the valour of our fighting forces, but those forces were kept in being and efficiency by a self-sacrificing, devoted, and able medical service. In times of peace such a service will be as much required as in times of war, and the public is fully aware of this. The public will see in the formation of a medical trade-union a perfectly legitimate course in some directions of medical work, but certainly not in other of the countless places where the medicine of the future will be the mainspring of legislation. Thus the formation of a medical trade-union will be attended by two difficulties: the movement will not receive enthusiastic adherence from all classes of the medical profession, and it will not be supported in entirety by the public for whose benefit it must be guaranteed to exist. We agree entirely with Dr. STANCOMB that an accredited body representing medical opinion ought to be placed in a position to negotiate with Governments upon medical questions, but we do not think that a medical trade-union, despite its obvious advantages in certain important crises, would secure for the medical profession that freedom to work and to develop for the public good which is our common policy. The questions here touched upon should be, and perhaps will be, discussed by the Joint Committee of the English Colleges whose Memorandum on the formation of the Advisory Medical Council under the Ministry of Health Bill will be found in another column. They are also questions which might well be closely debated by such a body as the Medical Parliamentary Committee aspires to become; but that body must be made representative of the various and varying interests concerned before what issues from it can have any political force. Will the necessary coöperation be given to that Committee, as a temporary measure, and in recognition of the fact that no medical body, not even the Royal Corporations or the powerful British Medical Association, separately or in combination, can claim to speak with the common voice of all?

The Prevention of Influenza.

WE are still on the rising side of the third wave of the influenza pandemic and, it is to be hoped, nearing the crest. From the clinical records as yet available the type of disease does not appear to be widely different from that of previous waves except that severe cases, although lamentably frequent, do not form so large a proportion of the total attacks. There is also a wide impression that older people have lost the relative immunity which they at first enjoyed, an opinion, however, not based upon exact figures and possibly having its origin in the invasion of every hitherto safe nook and cranny in the inhabited world. Preventive measures are still being much canvassed, although the situation must soon be profoundly modified by the exhaustion of all susceptible clinical material. Few countries in the world have failed to issue instructions to their sanitary authorities and warnings to the public, and our own Local Government Board has taken the opportunity of resuming the accumulated experience of the past six months in a Memorandum which has just been widely circulated. This Memorandum, which includes the substance of the letter of advice issued by the Royal College of Physicians of London, is insistent upon the essential need of teaching the individual citizen to realise his duty to the community. The central pivot in the preventive programme is therefore a leaflet of advice to the public which runs as follows:—

1. The golden rule is to keep fit, and avoid infection as much as possible.
2. The way to keep fit is to cultivate healthy and regular habits, to eat good food, and to avoid fatigue, chill, and alcoholism. Healthy living does not of itself ensure against attack, but it makes the patient better able to withstand the complications which kill.
3. The early symptoms of influenza are usually those of a severe feverish cold. Though the actual cause of the disease is unknown, we do know that it is rapid in onset, that it is most infectious in its early stages, and that it is spread by discharges from the mouth and nose, and that it kills mainly by its complications. Every person suffering from the disease, no matter how mild the form, is a danger to others.
4. It is not always possible to avoid infection, but the risks can be lessened by—
   (*a*) healthy living;
   (*b*) working and sleeping in well-ventilated rooms;
   (*c*) avoiding crowded gatherings and close, ill-ventilated rooms;
   (*d*) wearing warm clothing;
   (*e*) gargling the throat and washing out the nostrils;*
   (*f*) wearing a mask† and glasses when nursing or in attendance on a person suffering from influenza.
5. Do not waste money on drugs in the false hope of preventing infection.
6. Those attacked should—
   (*a*) go home, go to bed, and keep warm;
   (*b*) call in a doctor;
   (*c*) occupy, if possible, a separate bedroom or a bed that is screened off from the rest of the room;
   (*d*) when coughing or sneezing hold a handkerchief in front of the mouth; the handkerchief should be boiled, or burnt if of paper;
   (*e*) use a gargle as described;
   (*f*) be careful during convalescence in order to avoid relapse or complications;
   (*g*) avoid meetings and places of entertainment for at least one week after the temperature has become normal.

Most of the measures, it will be seen, are based on the now generally accepted dogmas that influenza is to all intents carried exclusively by direct contagion and principally in the form of droplets of infected secretion expelled in the act of speaking, coughing, sneezing, or hawking. The Memorandum attributes a lesser danger to the finer infective particles carried over longer distances by draughts or air convection currents, the virus rapidly becoming attenuated outside the body.

These dogmas suggest a number of rather obvious general measures on which all are agreed, but which, nevertheless, require for their complete carrying out a degree of carefulness on the part of the average citizen which is by no means yet at the command of even the most enlightening local authority. Two special measures merit further discussion, inasmuch as they have been prominently

* The following may be used as a gargle:—A solution of common salt (one teaspoonful to a pint of warm water) to which a few crystals of potassium permanganate are added—enough to make the solution pink.

† The mask, which may be made of gauze (4 layers) or butter muslin (3 layers) should cover the mouth and nose. To protect the eyes it is advisable to wear goggles.

brought before the public in the daily press and are not uncontroverted in medical circles. Face masks, the Memorandum suggests, should be used as much as possible by those attending on the sick, and certain authorities have gone further, especially in America, and have enjoined their general use by the public whilst travelling or exposed to infection in ordinary social intercourse. We do not know on what evidence the influenza mask has been held to be an efficient preventive, but a careful investigation by Dr. LAUTERBURG at the instance of Professor H. SAHLI, of Berne, has shown[1] that the usual mask of commerce in Switzerland is completely permeable for the fine droplets which Professor SAHLI considers to be the principal medium of infection. Dr. LAUTERBURG carried out his experiments with a mask, adapted to a plaster-cast of the face, through which air was aspirated at a pressure carefully regulated to be less than the inspiratory force. A nebulised watery suspension of *B. prodigiosus* passed freely through the mask. In commenting upon this result SAHLI does not deny that the mask may yet serve some purpose by holding back the coarser particles of secretion expelled into the air during the act of coughing. But he holds with the Flügge school that these visible pellets play an infective rôle subordinate to that of the infected droplets which may remain suspended for hours and be carried direct into the alveoli of the lung. Analogy with the cotton-wool plug of the culture tube may, SAHLI thinks, have led observers astray, the conditions being very different in the case of the plug, which is of much denser construction and has no suction on one side of it to draw bacteria through. The kindred observations of his colleague, Professor KOHLSCHÜTTER, suggested that gas masks also failed in their purpose by allowing small particles of moisture charged with poison gas to pass readily the material employed. SAHLI does not discourage the use of goggles and of a kerchief held before the mouth and nose by physicians and nurses for their own protection, stating that such measures have a useful educational influence upon the patient in contrast to the feeling of amazed horror aroused by masked attendants. It would be more reasonable for the patient to wear a mask, but this is impracticable in view of further impeding respiration, which already may be difficult.

The second measure around which discussion centres is the value of preventive inoculation. Since we are uncertain of the primary cause of influenza, so the Memorandum runs, no form of inoculation can be guaranteed to protect against the disease itself. In this connexion SAHLI'S well-known distrust of hasty generalisations may lend special weight to his views. The fact of naturally acquired immunity in influenza he holds to be proven beyond doubt, first by the critical fall of temperature which points to the sudden appearance of antitoxic forces in the organism (using the term antitoxic in its widest sense); then by the occurrence of relapses in the strictly isolated patient, who must, in order to relapse, have been harbouring the active virus against which he was in a measure protected; and, thirdly, by the partial immunisation of humanity shown in the long periods between successive pandemics. Young adults have been specially affected by this epidemic both at home and abroad, and SAHLI in accepting this fact for both the pandemics in his own experience deduces from it that younger people were first attacked owing to the residual immunity retained by the older section of the community. These facts have an important bearing on the rationale of artificial immunisation, while they greatly complicate accurate judgment upon its results. To the relative failure of immunisation against influenza in animals SAHLI does not attach much weight except in deducing from it the unlikelihood of obtaining a really potent antitoxic serum. The vaccine he has employed himself contains 80 million bacilli in the initial dose of 0·1 c.cm. To use a larger dose than this was to run the danger of provoking the disease by inducing a negative phase in subjects already exposed to infection, but this limitation he finds unfortunate, as it is only the large dose which confers a high degree of immunity when the immediate risk of infection is not present. One interesting and apparently forgotten observation by Dr. JULIUS GOLDSCHMIDT may be recalled from the previous epidemic—namely, that in the island of Madeira revaccination against small-pox protected the population very materially against a simultaneous epidemic of influenza. It is quite evident that the inoculation method requires and deserves all the attention which can be given to it. Experience is accumulating rapidly in many countries, and the results when obtained and collated should be available for use in the next pandemic if preventive medicine has not by then forestalled the need for it.

[1] Correspondenz-Blatt für Schweizer Aerzte, Feb. 15th, 1919.

The French Supplement to "The Lancet."

THE article in the French Supplement in our present issue on the Surgical Complications following Exanthematous Typhus, raises once more the interesting question of mixed infections. Quite apart from the fact that the terms mixed infection and latent infection are not clearly defined bacteriologically, and are consequently used in a vague sense, the question of symbiosis is likely to become one of importance in the near future. Dr. PAUL MOURE and Dr. ETIENNE SORREL discuss the problems as they may be associated with the presence of tubercle bacilli and pyogenic cocci in an infective disease of doubtful bacteriology; whilst the prevailing influenza epidemic is now daily raising similar etiological difficulties in yet another direction. Bacteriologically there are as yet very few facts to generalise upon. Extensive observations are needed upon pleomorphism, pathogenicity and susceptibility, classification and nomenclature. In the meantime we must fain rest content with an interim view that certain so-called zymotic diseases, and amongst them typhus, measles, and whooping-cough, diminish the resistance of the human body to pathogenic organisms such as the tubercle bacillus and the pyogenic cocci. Quite a number of similar examples might be chosen at random from the epidemiological history of the present war. After all, it was but another aspect of this same subject, the identity of infective disease, which called forth Sir WILLIAM JENNER'S famous remark that the voice of Nature could only be heard "by patience and daily watching, by keeping honest record of every sound she uttered—by joining letter to letter, adding word to word and line to line."

Annotations.

"Ne quid nimis."

ACUTE INFECTIVE POLYNEURITIS.

How the discovery of a new technique may be fruitful in many directions is exemplified in the case of a research described under the above title in the current numbers of the *Quarterly Journal of Medicine* by Major-General Sir John Rose Bradford, Captain E. F. Bashford, and Captain J. A. Wilson. The successful cultivation by the Noguchi method of the "filter-passer" globoid bodies, which are regarded as the causative organism in acute poliomyelitis, led the authors to employ the same method in the case of other diseases. As stated in their communication to THE LANCET of Feb. 1st, they have been successful by this means in cultivating organisms from cases of acute infective polyneuritis, trench fever, influenza, nephritis, mumps, measles, rose measles, typhus, and encephalitis lethargica, which, in the case of the first four, they have shown to produce these diseases when injected into animals, and which are recoverable from those animals while suffering from the maladies thus caused. During the campaign in France and Flanders a group of cases with generalised palsy of a peculiar character has been recognised. In most of the cases three stages in the disease can be observed:—(1) An initial illness; (2) a period of latency; (3) a paralytic stage. The initial illness consists of moderate pyrexia, headache, vomiting, and pain in the back: occasionally sore throat and pains in the limbs. These symptoms disappear in a few days. The period of latency seems to be variable, in many instances lasting but a few days, in some four to six weeks, while in others the paralysis appears to be the first manifestation of the disease. The paralytic stage may occur suddenly, but is generally ingravescent and accompanied by paræsthesiæ of the extremities. The main peculiarities of the palsy are that the legs are affected as a whole—i.e., there is no picking out of individual muscles as in poliomyelitis, but the proximal is usually more affected than the distal part of the limbs; the arms and muscles of the trunk are always affected, while palsy of the facial muscles, which is bilateral and occurs later in the disease, is most characteristic. Paralysis of the third nerve was not observed at all, and palatal palsy was very rare in the series of 30 cases studied. The objective sensory changes are usually relative in degree and have a glove-and-stocking distribution. The deep reflexes are abolished, while sphincter control is not profoundly affected and may remain normal up to the end even in fatal cases. No cerebral or mental symptoms are recorded. The blood shows a moderate leucocytosis and the cerebro-spinal fluid exhibits no abnormality. The mortality is high—8 out of 30 cases—half the deaths occurring within a week of the onset of the paralysis and being due to respiratory failure. Recovery is slow but complete, the facial muscles often being the first to show improvement. Macroscopic examination post mortem is negative. Microscopically the lesions found are: (1) acute neuritis in the nerves, particularly the large trunks; (2) scattered minute hæmorrhages, diffuse round-celled infiltration, and degeneration of nerve cells in all parts of the grey matter of the cord, medulla, and brain. Captain Bashford states that "consideration of the whole pathological process would point to a septicæmia or systemic poisoning, which enters the central nervous system by way of the nerve trunks, both motor and sensory, and is probably of an infective nature." The accuracy of this last statement is proved by the results of subdural inoculation of monkeys with emulsion of human spinal cord preserved in glycerine. The animals developed a disease identical with that observed in man, and inoculation of further monkeys with material from those affected was also successful.

All attempts to cultivate the organism by ordinary methods failed, but success was attained by employment of the technique of Flexner and Noguchi. Captain Wilson states that "the conditions of growth, whether a primary culture or subculture is in question, are of a strictly limited character, and remains so." The organism is similar to the globoid bodies of poliomyelitis in its general features, appearing as a rounded, oval, or kidney-shaped body measuring 0·2 to 0·5 μ in diameter, presenting a darkly stained, rounded spot, which is surrounded by a narrow faintly stained area. But it differs in several minor characters and crucially in that "the organism isolated from cases of polyneuritis inoculated subdurally into monkeys produces a disease which is clinically and pathologically distinct from anterior poliomyelitis, a disease which is identical with that from which it was obtained." Sir John Rose Bradford points out that, "in the presence of these facts, the conclusion would seem to be justified that so-called acute febrile polyneuritis is really a malady allied to, but quite distinct from, poliomyelitis. The conclusion would entail as a corollary that the virus of poliomyelitis, instead of being an isolated and peculiar virus, is really one member of a class of organisms, and that the virus of polyneuritis is another, but distinct, member of this class." In view of what has been already achieved by the application of the new cultural methods, such words appear to us to open up a vista of immense possibilities in the not too distant future.

EPIDEMIC "FOOD POISONING."

IN the spring of 1918 an outbreak of "food poisoning" occurred in a military depôt in France. The opportunity thus offered for a combined epidemiological, clinical, and bacteriological research was not missed, and a report on the investigations, which were carried out by Captain H. M. Perry and Captain H. L. Tidy, has been published by the Medical Research Committee,[1] and constitutes a valuable contribution to our knowledge of the subject of "food poisoning" in general. Outbreaks of "food poisoning" are not of uncommon occurrence, and a number of such epidemics have been investigated in detail in different countries. In all of them the clinical features have been similar, whilst the general characteristics have been the simultaneous development of symptoms and their limitation to persons who have partaken of some particular article of food. The epidemic under consideration varies in that while the infection was conveyed through the consumption of food, after the initial outbreak subsequent cases occurred extending over a prolonged period.

Now bacteriological investigation of the foodstuffs and of the "poisoned" individuals in epidemics occurring during the past 30 years has led to the incrimination as causative agents of an interesting group of bacteria, two members of

[1] A Report on the Investigation of an Epidemic Caused by *Bacillus aertrycke*, Medical Research Committee, Special Report Series, No. 24. 1919. 9*d*. net.

which, the *Bac. enteritidis* of Gaertner and the *Bac. aertrycke* of Durham and De Nobele, are most usually at fault. The epidemic with which Captain Perry and Captain Tidy had to deal was due to the latter bacillus. There is still divergence of opinion as to the relations of the organisms of this "salmonella" group to each other and to those of allied groups, and not the least interesting feature of the report is that the authors are able to produce evidence demonstrating not only the possibility but the desirability of differentiating between these bacteria. Of prime importance to the medical reader is the establishment of the fact that "food poisoning" may not only be caused by the consumption of food in which active toxins are present, but also by an actual bacterial infection directly attributable to the ingestion of food contaminated by a "chronic carrier." The report is worthy of careful perusal alike by the epidemiologist, the clinician, and the bacteriologist. Not only is it informative, but it contains much that is suggestive, more especially as to the relationship between "food poisoning" and other forms of enteritis. Whilst drawing the attention of our readers to the report, we venture to congratulate Captain Perry and Captain Tidy on an accomplished piece of work.

TWENTY YEARS OF PLAGUE IN INDIA.

INDIA for some years has been by far the most important reservoir of plague infection in the world. Much of our knowledge of the disease has been gained by investigations in that country, and any report on the subject that comes from India is especially valuable, the more so if it is furnished by an expert. A recent report of great interest has been supplied by Major F. Norman White, C.I.E., Sanitary Commissioner with the Government of India,[1] giving details of the annual epidemics of plague in India during the past 20 years. As is known, the disease was brought to Bombay in the autumn of 1896, but it was not until 1898 that it became more widely diffused outside that province. Like other eminent Indian epidemiologists, Major White adopts, not the calendar year, but "the plague year," which begins in July and ends in June of the following year. As July is the month of the smallest incidence of plague in India, it forms a suitable starting-point for tracing the annual curve, which, rising in the latter months of the year, attains its maximum in the following March and April, and falls rapidly in May and June. From July 1st, 1898, to June 30th, 1918, more than 10¼ millions of people died from plague in India. The four most serious epidemics were: (1) in 1904–5 when 1,328,249 fatal cases were recorded; (2) in 1906–7 when there were 1,286,513 deaths; (3) 1903–4 when 1,138,451 persons died; and (4) 1917–18 when 820,292 deaths occurred. The two mildest outbreaks were: (1) in 1898–99 when 119,045 fatal cases were reported; and (2) in 1908–9 when 126,442 deaths were registered. The three Indian provinces which experienced the worst ravages of plague were the Punjab, which during the 20 years lost 2,992,166 of its population from the disease; the United Provinces of Agra and Oudh, which lost 2,386,332; and the Bombay Presidency, which lost 2,295,221. Some parts of India have suffered but little from the scourge, and it is stated that the districts which have practically escaped have been mainly the rice-growing areas, the worst sufferers being the wheat-growing districts. It is suggested that in rice-growing districts comparatively little grain is imported from other localities, and that the facilities afforded by the movement of grain for the transport of the infection (by infected rats and their fleas) explains the difference to some extent.

Major White draws attention to varying intensity of plague epidemics in different localities and in different years. In this connexion he refers to the investigations of the Plague Research Committee, which showed that the severity and diffusibility of plague outbreaks in certain areas appear to depend upon conditions of atmospheric humidity, which in turn depend on rainfall. Humidity in excess of the normal at certain seasons of the year is beneficial to the rat flea in all stages of its development; and a flea population in excess of the normal appears to be essential to plague epidemics of more than average intensity. Major White thinks that there is some evidence of a diminished virulence of the plague infection in certain localities, and the suggestion is made that this may be due to an increasing immunity of the rat population. But this immunity of the Indian rat cannot be said to be by any means general, and it is probable that a long time will elapse before a marked decrease of plague in India from this cause will become apparent. In the *Times* recently an optimistic writer discussing this question stated, "there are now perceptible signs that the periodical epidemics are permanently abating in virulence." But the latest available figures, those above mentioned for 1917–18, relating to India as a whole, hardly support this too sanguine opinion, as that outbreak, the worst that had occurred for 10 years, caused the deaths of 820,292 persons. It is unlikely that the plague-mortality in India will become permanently reduced until public health administration, especially in the rural districts, has been placed upon a better footing. It is satisfactory, however, to learn that steps in this direction have already been taken, but much more remains to be done.

[1] Twenty Years of Plague in India, with Special Reference to the Outbreak of 1917-18. Published in the Indian Journal of Medical Research, vol. vi., No. 2.

OCCUPATIONAL FRACTURES.

WE are accustomed to hear much about diseases of the skin due to the occupation, and various diseases, such as lead poisoning, are also classed together as caused by the trade or business; but it has not been so well recognised that there are certain fractures which are almost, if not entirely, due to the work which the sufferer has been doing. Last week we published a paper by Lieut.-Colonel A. L. Johnson, C.A.M.C., which describes a highly interesting form of fracture of the humerus caused by a blow from the propeller of an aeroplane. The author had seen four cases of the condition and in each instance there was a fracture of the right humerus a short distance above the condyles. The fracture was compound, and the wound and the fracture were both caused by a blow from the blade of the propeller from a premature starting of the engine before the mechanic, who was "swinging" the propeller, could get out of the way. It certainly deserves to be classed with the occupational fractures. Many motorists are painfully aware of the very analogous fracture which arises from the back-fire of a motor engine when starting, or sometimes it may be caused from the handle striking the wrist. This "chauffeur's fracture" affects the radius near its lower end, but the exact site varies, and now

that self-starters are becoming common the lesion is growing rarer. The war has led to the production of a new form of fracture of the humerus. When hand-grenades were first introduced many men endeavoured to throw them as if they were cricket balls, forgetting that their weight was much greater. The momentum caused by the weight of the grenade was in many cases sufficient to cause a curious spiral fracture of the bone. The same kind of fracture has been met with but very rarely as a result of the throwing of a cricket-ball, and it is quoted in the text-books as an example of a fracture caused by muscular action. The spiral fracture of the fibula which is sometimes sustained by the inexpert performer on skis also belongs to this class. We may take it as certain that any new industry or sport is likely to give rise to some new form of disease or injury, and the latest of these is the propeller fracture.

THE RESTORATION OF GLYCERINE AND OTHER MEDIA TO THE PHARMACOPŒIA.

AT its meeting on Feb. 24th, 1919, the Executive Committee of the General Council of Medical Education and Registration, having considered the advisability of withdrawing the temporary alterations in the British Pharmacopœia published during the war, and arising out of the scarcity of sugar, glycerine, and certain oils and fats, adopted the following resolution:—

"That the Executive Committee, on behalf of the Council, order and direct that, on and after April 30th, 1919, the British Pharmacopœia, 1914, shall be altered and amended by revoking and withdrawing the alterations and amendments made and published in the *Gazettes* of July 27th, 1917, and March 29th, 1918; and that formal intimation of such revocation and withdrawal be published according to law in the *Gazettes* of London, Edinburgh, and Dublin, on April 30th, 1919."

This resolution will be welcomed and a word of praise may well be accorded to those authorities who issued instructions as to how glycerine and other media could be replaced in official preparations. As a temporary measure the inconvenience caused by the restrictions was not so serious as some anticipated. From time to time we have published notes as to how glycerine and sugar could be spared by the use of substitutes, which in the majority of cases could be made to serve the same purpose. While this information was useful there is little doubt that a return to the classic excipients will be appreciated.

LOUPING ILL.

SEVERAL investigations have recently been carried out on this disease in sheep, but little progress made in its prevention. In the last number of the *Journal of Comparative Pathology and Therapeutics* Sir Stewart Stockman, of the Board of Agriculture and Fisheries, discusses the rôle played by ticks in the production of louping ill. Particulars are given of 101 experiments conducted by the Board with a view of throwing light upon the cause, nature, and course of the disease. Sir S. Stockman is not inclined to think that the complaint in sheep has any close relationship to poliomyelitis in human beings. The disease is definitely tick-borne, and the infecting agent is not a toxin. It is transmitted by larval ticks (*Ixodus ricinus*) from females which have been feeding on the blood of infected sheep. It was also produced by adult ticks which had been fed as nymphs on infected animals and by inoculation of gland juice and blood from such animals. Arrangements are being made to test the practical value of protective inoculation in the case of adult sheep brought on to farms for the purpose of re-stocking, as well as in lambs born on the farms. The eradication of the tick suggests itself as one way of preventing the disease, and an intensive study of the life-history of the parasite is obviously a preliminary to the framing of an appropriate campaign.

THE TOLL OF INFLUENZA.

THE recrudescence of the influenza epidemic is brought home to us this week by the fact that we have to regret the death of Major H. Graeme Gibson, R.A.M.C., whose paper, in coöperation with Colonel S. L. Cummins, A.M.S., on Tetanus in the British Army appears in this issue of THE LANCET. Again, only last week we published an interesting article on the blood-supply of muscles, with reference to war surgery, by Captain J. Campbell, R.A.M.C., and Captain C. M. Pennefather, R.A.M.C., and we regret to say that while the proofs were in his hands for correction Captain Campbell died at a nursing home in Liverpool. Mr. Harry Blakeway's untimely death while acting as resident assistant surgeon to St. Bartholomew's Hospital is a calamity to the hospital which he served so well, and a sad loss to the review columns of THE LANCET, where his wide reading and clinical experience made him a valued coadjutor.

THE MARRIAGE-RATE OF SOUTH AUSTRALIA.

THE Annual Report for 1917 of the Registrar-General for South Australia, Mr. Adrian J. Korff, has just been issued, and among the outstanding features of the report the following may be noted:—

"The number of marriages showed a considerable falling off, and was very much below the average of the last 10 years, and the marriage-rate also declined to a figure lower than that of any year since 1906.

The fall in marriages was reflected in births, which also stood at a low figure for the year, being nearly 1000 less than the average of the preceding five years.

The infantile mortality-rate for 1917 was very favourable, the *proportion of deaths of infants to 100 births* registered was the lowest ever recorded, and was very serviceable in balancing the decline in the birth-rate.

The death record was much below the average, and the death-rate was the lowest for the last six years."

Owing, however, to the small number of births, the natural increase for the year 1917 was considerably under the average, and the sex proportion of those births presents some interesting features.

"Of the total births registered, 5762 were male and 5564 female, the proportion of the former to 100 of the latter being 103·56. The Commonwealth ratio in 1917 was 105·25, and in England, according to recent returns, the proportion for the five years ended with 1916 was 104·0. In the last annual report I stated: 'The proportion in 1916 for South Australia was unusually high, and at first sight might seem to give support to statements which have been made that the rate of male to female births is increased in time of war; but it may be pointed out that 109·60 is not by any means a record for this State—in two successive years, 1887 and 1888, the proportions were 109·70 and 109·82, while in 1903 the high total of 111·29 was reached. The average decennial rates for the last 30 years were: 1887–1896, 104·78; 1897–1906, 105·62; 1907–1916, 105·43, the decade including the two war years 1915 and 1916 taking only second place in the averages."

As the proportion of male births for 1917 (103·56) was very much lower than that of any of the four preceding years, and was below the average of the 14 years 1904-1917, the female predominance in South Australia is very marked.

Sir Nestor Tirard has been appointed Consulting Physician to King's College Hospital, and has been elected Emeritus Professor of Medicine by the Council of King's College, London.

THE MINISTRY OF HEALTH BILL.

THE ACTION OF THE GENERAL MEDICAL COUNCIL.

THE Executive Committee of the General Medical Council, at its meeting on Feb. 24th, considered a communication from the Lord President of the Privy Council inviting its observations on the Ministry of Health Bill, 1919, of which he forwarded copies.

The Committee, on behalf of the Council, authorised the President to forward the following resolutions on the subject to the Lord President, for communication to the Government:—

1. That the Executive Committee observes with regret that the Bill does not extend to the whole of the United Kingdom, as was urged in the resolution of the General Medical Council of Nov. 30th, 1918, and that the Executive Committee presses on the Government the importance of introducing legislation corresponding to that proposed for England and Wales, and for Scotland, appropriate to the special conditions obtaining in Ireland.
2. That the Memoranda No. 1 and No. 2, laid before the Executive Committee by the Irish Branch Council, be transmitted to the Lord President for his information.
3. That in view of the very varied medical functions devolving on the Ministry of Health in Scotland, including measures for the prevention and cure of diseases, the treatment of physical and mental defects, the collection and preparation of information and statistics relating thereto, and the training of persons engaged in health services, the Executive Committee is of opinion that not less than one-third of the members of the Scottish Board of Health should be persons who are registered under the Medical Acts.
4. That the Executive Committee welcomes the introduction into the Bill of Clause 3 (2) (*d*), whereby the powers and duties relating to public health, now exercised by Government departments other than those expressly mentioned, may by Order in Council be transferred to the Ministry of Health; and that it is desirable that the General Medical Council should before they are issued have an opportunity of considering the several draft Orders in Council so contemplated for the transfer of such medical powers and duties.

It was decided that these resolutions should be communicated to the Lord President of the Council, with a request that he would be pleased to transmit them to the Government.

CONJOINT ACTION OF THE ENGLISH COLLEGES.

Early in July last the Royal College of Physicians of London and the Royal College of Surgeons of England appointed a Joint Committee with power to coöpt other members, whose duty it should be to place before the Government the conditions conceived to be essential in a Ministry of Health Bill.

The members of the Joint Committee are: Dr. Norman Moore (President of the Royal College of Physicians), Sir George Makins (President of the Royal College of Surgeons), *Lady Barrett, M.D., Sir John Broadbent, Sir Bertrand Dawson, *Dr. Herbert French, *Dr. W. H. Hamer, Sir Robert Jones, *Dr. H. R. Kenwood, Sir Berkeley Moynihan, Dr. J. A. Ormerod, *Dr. John Robertson, Mr. Charles Ryall, and Mr. H. J. Waring. Mr. F. G. Hallett is acting as secretary and the coöpted members names are marked with an asterisk. The Home Secretary, now Viscount Cave of Richmond, with other members of the Home Affairs Committee of the War Cabinet, on July 29th received a deputation which submitted certain proposals, including the appointment by the Minister of an advisory body specially qualified to consider medical questions, the right of such body to meet frequently and to have direct access to the Minister, the equal representation on that body of curative and preventive medicine, and with a view to providing that the best opportunities for the prevention of disease and for the maintenance of health should be available for every member of the community.

A Memorandum just issued by the Joint Committee runs as follows:—

The Committee considered at many meetings the conditions it conceived to be essential to any scheme for setting up a Ministry of Health, in so far as it concerned England and Wales; it was considered that the profession in Scotland and Ireland would more fittingly deal with those portions of the United Kingdom.

While realising the difficulties there would be in gathering together the health departments at present scattered through various ministries under one head and effecting disentanglement from the Poor-law, the view was strongly held by the Committee that if the Health Ministry is to take a wide outlook and be as little restrained as possible by established tradition and habit, it should not be more associated with any existing Government Department than is absolutely necessary to secure efficient organisation. In the opinion of the Joint Committee the aim of any sound health policy must be to render available the best opportunities for the prevention of disease and the maintenance of health for every member of the community.

Considering that a large proportion of the work of the Health Ministry, both as regards its policy and its execution, will depend on the knowledge and coöperation of the medical profession, the Joint Committee considered it essential that there should be appointed by the Minister of Health an Advisory Medical Council, drawn from every section of the profession, such Council to have direct access to the Minister, and the power to initiate advice.

Since there will probably be other advisory councils besides the Medical Advisory Council, the Joint Committee are of opinion that there should be a connecting committee in the Ministry for the correlating of the work of the Advisory Councils in order to prevent overlapping and conflict of advice.

The Medical Advisory Council, to be of real use to the Minister, and through him to the nation, must be of limited size—say, 21 members. It cannot, therefore, be representative of the members of the medical profession in the Parliamentary sense. Its members must be not only individually excellent, but such as will together constitute a good council of advisers.

To this end the Joint Committee laid down the principle that in selecting the members of this Council greater regard must be had to special attainments and experience than to interests and organisations as such.

Subject to this primary aim, an endeavour should be made to represent the individual members and the corporate life of the profession.

The Memorandum adds that the Joint Committee were later received sympathetically by the then Minister of Reconstruction, Dr. Addison, when explaining and urging these views. Conferences between the representatives of the Joint Committee of the Royal Colleges and the representatives of similar committees of the Royal Society of Medicine and the British Medical Association have been held for the consideration of these important questions relating to the proposed Ministry of Health. At these conferences there has been substantial agreement, a fact of great importance in view of the large body of medical opinion these three bodies together represent. The Joint Committee will continue their deliberations with a view to helping in the formation of a sound national health policy.

PROPOSED EXTENSIONS OF THE INSURANCE MEDICAL SERVICE.

HAVING practically completed the examination of the present conditions of service, and possible modifications of them, as regards the duties of insurance practitioners (subject to the present limitations of the scope of services provided) the Commissioners and the Conditions of Service Subcommittee of the Insurance Acts Committee were proposing to proceed, in their Twelfth Conference on Feb. 6th, 1919, to the consideration of possible *extensions* of the scope of service, including both those new services for which grants were voted by Parliament in August, 1914,[1] and any other extensions that might appear desirable.

It had been agreed, both by the Commissioners and the Insurance Acts Committee, that a satisfactory examination of this subject would not be possible unless there were present to take part in this portion of the discussions an adequate number of physicians and surgeons and other medical practitioners representing types of experience specially involved in the subjects now to be discussed, and not included in the membership of the Conditions of Service Subcommittee.

With this object the Commissioners, with the concurrence of the Insurance Acts Committee, invited on this occasion

[1] (i.) Medical referees and consultants, with travelling expenses of insured persons presenting themselves for examination. (ii.) Provision of specialist consultations in connexion with the treatment of insured persons. (iii.) Grants in aid of the equipment and maintenance of clinics for the use of insurance practitioners. (iv.) Grants towards the provision of nursing for insured persons. (v.) Grants towards the provision of pathological laboratories.

the attendance of the following individuals, each of whom attended in a personal capacity only and to take part in the discussions, not to formulate definite conclusions: Dr. Norman Moore; Sir George Henry Makins; Mr. H. A. Ballance, late member of the Norwich Insurance Committee; Lady Barrett, M.D., late member of the London Insurance Committee; Dr. R. A. Bolam, member of Northumberland Insurance Committee; Dr. G. S. Buchanan, one of the medical officers of the Local Government Board; Sir Bertrand Edward Dawson; Dr. A Free and Fergus; Dr. A. Fulton, Vice-Chairman, Nottingham Insurance Committee; Dr. H. R. Kenwood, President of Society of Medical Officers of Health; Dr. E. J. Maclean, late Chairman Cardiff Insurance Committee; Sir Berkeley G. A. Moynihan; Dr. Lauriston Shaw, member London Insurance Committee.

The members of the Conditions of Service Subcommittee are as follows: Dr. H. B Brackenbury (chairman), Dr. T. Ridley Bailey, Dr. H. G. Cowie, Dr. H G. Dain, Dr. J. R. Drever, Dr. E. R. Fothergill, Dr. P. V. Fry, Dr. S. Hodgson, Dr. A. Linnell, Dr. H. L. Rutter, Dr. J. P. Williams-Freeman, and Dr. Alfred Cox (medical secretary) and Dr. James Neal (deputy medical secretary) of the British Medical Association.

It was agreed that (without prejudice to such modification as might appear in the course of discussion to be desirable) the whole subject matter should be considered under the following heads:—

I. The additional services which should be provided.
II. The practitioners by whom these services should be rendered.
III. Persons not medically qualified who assist the practitioner—for example, nurse at operation.
IV. Premises and equipment.
V. The scheme of organisation into which the foregoing should be fitted.

Head I. being subdivided as follows:—

(*a*) Expert "out-patient" medical services.
(*b*) General practitioner services not at present available—for example, attendance at confinements, practitioner clinics.
(*c*) Laboratory facilities.
(*d*) Referees and supervisory medical officers.
(*e*) Ancillary services of skilled persons not medically qualified—for example, masseurs.
(*f*) Treatment in residential institutions (as in-patients).

This extended conference, just as in the case of the conferences between the Conditions of Service Subcommittee and the Commissioners concerning the present conditions of the existing Insurance Medical Service, is for deliberative purposes only; no decisions will be made by it. The purpose intended to be served is that of bringing together two different kinds of experience and points of view—namely, the public and administrative side and that of the medical profession, respectively, for exploring in advance the various questions which must necessarily or may advantageously arise in the consideration of any future revision of the terms and conditions of insurance medical service or extensions of the service, so that the ground may be cleared and the task of actual revision, when the time for it arrives, facilitated. For the furtherance of this purpose a report will be issued in due course.

CONTROL OF VENEREAL DISEASES.

Comprehensive Programme of the National Council.

AT a meeting of the National Council for Combating Venereal Diseases recently held at Edinburgh, with Sir Thomas Barlow in the chair, the following resolutions were passed:—

1. That the Local Government Board should authorise the appointment of whole-time venereal officers (a man and a woman) on the staffs of the medical officer of each county or county borough. (The women could usually combine venereal and infant welfare work.) That the present hospital accommodation should be supplemented by "ad hoc" clinics under the supervision of such venereal officers in every town of over 10,000 inhabitants and also in the county boroughs, such clinics to be open for continuous and early treatment both for men and for women, and visited at frequent intervals by the venereal officers, who should be empowered to call in practitioners resident in each locality to assist them. It is suggested that a subsidiary appointment of clinical assistant could be given to a resident practitioner in each centre, who would supervise the continuous and early treatment in the intervals between the visits of the venereal officer.

2. That hospitals and medical schools be requested to arrange special post-graduate courses for the training of medical women in the modern methods of treatment; a strong appeal is made to medical women to specialise in this subject.

3. That some means should be devised whereby medical practitioners are encouraged to diagnose venereal disease in patients and also to give early preventive treatment. In the meantime the Local Government Board could secure the services from the Military Medical Department of three or four of the recognised authorities on venereal disease, and arrange for them to hold conferences with the local medical men in various parts of the country, with a view to devising the best means of securing efficiency and continuity of treatment.

4. That the King's Regulations and the Army Act should be so amended as to enable men in an infective condition to be retained in the Navy and Army pending the completion of treatment, in order that they may return to civil life in sound health. It is understood that the Army Act must, in any case, be amended to meet various needs for the retention of part of the forces on demobilisation, and this could form an appropriate category among others

5. That it should be made a statutory obligation for every individual suffering from venereal disease to obtain and to continue treatment until cured.

6. That the Local Government Board should be asked to consider immediately whether some modified form of confidential notification of infective cases could be adopted under existing powers, and whether at a later date fresh powers could be obtained from Parliament.

7. That the Minister of Munitions should give definite instructions that all men and women working in the national and controlled firms would receive adequate instruction from responsible trained men and women.

8. That Clause 5 of the Criminal Law Amendment Bill, *as amended by the National Council*, should be passed as a short Act as early as possible next session. To make it effective an additional clause is necessary making it a statutory obligation on medical practitioners to warn their patients and to give evidence if required in a court of law under the Act (as is done in Queensland, Victoria, and Western Australia).

9. That the Joint Committee of both Houses should be reappointed directly the new Parliament assembles.

10. That an amended form of Clause 3 of the Criminal Law Amendment Bill should be passed next session.

11. That an organisation is needed which could train large numbers of girls in skilled employment, under discipline, returning them as self supporting members of the community as soon as possible, with no permanent slur on their character; such an organisation to be eligible for recognition by the Home Office under Clause 3.

12. That the Mental Deficiency Act should be amended to enable the protection of the community to be extended to the mentally defective individual suffering from venereal disease and the morally defective person.

13. That the Home Office be asked to encourage each town and county to appoint an adequate number of women police without delay.

The final resolution called on social organisations to develop the service of voluntary women patrols.

The Anti-venereal Campaign in the United States.

The Public Health Service of the United States is taking active steps to prevent the spread of venereal diseases in the country during demobilisation. The Chamberlain-Kahn Act, framed with a view of providing Federal aid for State anti-venereal work, has set up a Venereal Disease Division in the U.S. Public Health Service, and this division, acting in conjunction with the State Boards of Health, is now conducting about 125 venereal clinics. The attendance at these clinics is such that additional clinics are already needed. The division is also coöperating with the Red Cross in the conduct of 25 clinics in extra-cantonment zones, and arrangements have been made to initiate clinics in 102 cities under the joint auspices of the Public Health Service and the Red Cross. The work in general will embrace the following four principal features:—1. Educational: to acquaint the public with the nature of the diseases and the objectives to be accomplished. 2. Law enforcement: to secure coöperation of the physicians in reporting cases, and of the police in apprehending prostitutes, vagrants, and such other persons as can be reasonably suspected of having venereal disease in the communicable stage. 3. Propaganda: to secure local funds for providing detention homes and hospital facilities for isolation and treatment of venereal disease carriers who, by their habits, are a menace to the public health. 4 The establishment of increased facilities for early diagnosis and treatment.

Surgeon-General Blue recently asked ministers of religion to set apart a "Public Health Sunday" and to arrange for addresses on the nation's responsibility of protecting the health of its returning sailors and soldiers, as well as of the people generally. In his circular General Blue urges the necessity for enforcing, during the period of demobilisation, drastic measures to prevent a recurrence of the pre-war conditions in civil life which rendered venereal diseases the most fruitful cause of military disability. The safety of the soldiers during demobilisation is demanded "in order that the world may be made not only safe for democracy, but safe for posterity."

Thirty-nine States have adopted laws based wholly or in part upon the regulations drawn up by the Division

of Venereal Diseases, under which distribution of the respective allotments of the million dollars to be expended this year will be made to the States. The health authorities of these States have recognised venereal diseases as communicable and dangerous to the public health and have made them legally notifiable. It is anticipated that the remaining States, with possibly one or two exceptions, will do so in the near future. Thirty-two States have passed laws rendering it illegal for druggists to dispense nostrums and remedies for the treatment of venereal diseases.

The protection of the men in the military training camps seems to have been adequately and effectively supervised by the Army medical authorities, and the same may be said with regard to the personnel of the Navy. It is, however, obvious that the main source of infection and spread is the civilian population. The demobilisation of the soldiers will greatly complicate the situation, for not only has there been a decided increase of infection among the civilian population during the time the United States was at war, but the demobilised men will be likely easily to lay themselves open to the risks of infection. They are all young or in the early prime of lusty manhood; after the hard and dangerous life they have been leading, coupled with the fact that they are returning home safe and sound after a long absence, they are likely to be in that state of mind when caution is thrown to the winds, and this feeling will be intensified by freedom from discipline and all that it entails. In the Army they were protected as far as possible from the risk of infection, and, when infected, were treated promptly and efficiently. "In this country," writes one of our American correspondents, "the most rigid precautions were taken to prevent them contracting venereal disease. The obligation to protect the health of the military forces in civilian territory was placed upon the Public Health Service by Executive order and Act of Congress, and this duty has been performed excellently. The campaign inaugurated and being carried on under the auspices of the Public Health Service and the American Red Cross will undoubtedly have a good effect in protecting the demobilised men and preventing the spread of venereal diseases far and wide, but will hardly be successful in eliminating the menace. Many medical men here, as in Great Britain, are in favour of prophylactic measures similar to those enforced in the United States Army in 1912 and to those used among the Australian forces being employed in civil life, provided that it is possible. The seriousness of the problem is fully realised by both the public and the medical profession, and this realisation alone is to a great extent an augury of the success of the vigorous campaign that is being waged by the Government of this country for the protection of the demobilised soldiers and civilian population against venereal disease."

UNIVERSITY OF BRUSSELS:

RESUMPTION OF MEDICAL COURSES.

THE Free University of Brussels on Jan. 22nd resumed its former courses in the Faculty of Medicine for its own students, while at the same time the M.D. degree has again been thrown open after examination to registered medical practitioners of other countries.

The Domestic Medical Curriculum.

The curriculum of study for Belgian students includes a course of human anatomy and embryology, conducted by M. Brachet and M. A. Lameere; physiology and histology is taken by M. Dustin and M. J. Demoor; chemical biology and physiology by M. Slosse; surgical pathology by M. Depage, who also conducts the surgical clinic at St. Pierre; general pathology by M. Spehl; midwifery, including the obstetric clinic at the Maternité, by M. Cocq; pharmacology and therapeutics by M. Jacques; bacteriology, parasitology, and epidemiology by M. Bordet; special pathology and therapeutics of internal diseases, and the medical clinic at St. Jean, by M. René Verhoogen; morbid anatomy, by M. Sténon; medical clinic at St. Pierre, M. Vandervelde; surgical clinic at St. Jean, M. J. Verhoogen; psychiatry, M. Lev; ophthalmology and clinical ophthalmology at St. Jean, M. Gallemearts; theory and practice of operative surgery, M. Laurent; medical jurisprudence, M. Heger-Gilbert; hygiene, M. Gengou. Complementary clinical courses are also arranged for students and doctors of medicine who have registered with the secretary of the university, and include courses at St. Jean and St. Pierre on children's diseases, mental affections, skin diseases, syphilis, gynæcology, and diseases of the ear, nose, and throat. Courses of instruction for the diploma of public health have been arranged, as well as free courses in (among other subjects) anthropology (M. Houzé), practical urology (M. le Clerc-Dandoy), diseases of children (M. Péchère), gynæcology (M. Rouffart), practical radiology (M. Hauchamps).

The M.D. Brussels for Strangers.

The examination for the M.D. degree is arranged in three parts. No conditions of residence are needed; the time required for the three examinations seldom exceeds 10 or 12 days, and candidates who are unable to be so long away from home may take each part separately. The examinations are conducted in English through the medium of an interpreter (without additional charge). They take place on the first Tuesday in November, December, March, and May, and the second Tuesday in June. They are *viva voce*, but candidates may have a written examination by paying an additional fee of £1 for each test. This does not exempt them from the *viva voce* examination. Part I. includes general medicine; materia medica and pharmacology; general surgery; and the theory of midwifery. Part II. includes general therapeutics; pathology and morbid anatomy, and the use of the microscope; special therapeutics and medicine of internal diseases; special surgery; and mental diseases. Part III. includes public and private hygiene; medical jurisprudence; clinical medicine; clinical surgery; examination in operative surgery, consisting of some of the usual operations on the dead subject—viz., amputation, ligature of artery, &c.; ophthalmology; examination in midwifery, consisting of obstetrical operation on the mannequin (model of pelvis), examination in regional anatomy with dissection; and bacteriology.

Further information may be obtained from the secretary of the University, rue des Sols, 14, Brussels.

NEW YORK.

(FROM OUR OWN CORRESPONDENT.)

Recrudescence of Influenza.

THERE has been an unpleasant, almost menacing, recurrence of influenza in New York City, and the contagion appears to be again spreading. As in the recent outbreak, the disease is accompanied, or rather complicated, by pneumonia, to which most of the mortality is due. Medical men here, as elsewhere, are not agreed as to the most effective means of treating influenza. Many of the practitioners here, perhaps the majority, employ one or other of the coal-tar products for the purpose of lowering the temperature. Some, however, hold that such treatment is frequently harmful owing to the depressant action of these drugs, which may in the long run do more harm than good. The administration of Warburg's tincture has been advocated by some. The use of vaccines has been followed with little or no success. The suppression of influenza undoubtedly depends on rational preventive methods rigidly enforced, although it is plain that their enforcement is attended with numerous difficulties.

A New Narcotic Drug Law for New York State.

A new narcotic drug law has been created recently in New York State which supersedes the existing law, and came into force on Feb. 1st. According to the enactments of the new law every physician, druggist, dentist, veterinarian, hospital, sanatorium, or other institution, manufacturer or wholesale distributer, prescribing, administering, dispensing, selling, or manufacturing cocaine, opium or its derivatives, had, during the month of January, to file an application and receive from the department a certificate of authority to deal in habit-forming drugs. No fee is required, and the registration will stand for the remainder of the State fiscal year; after that time, during the month of June in each year, those coming under the above designation shall in like manner register with the New York State Department of Narcotic Drug Control, and for this and each

subsequent registration a fee of $1.00 shall be paid to the Department.

Prohibition in the United States.

There is much strong feeling with regard to the question of the prohibition law which will come into effect in all States of the Union in January, 1920. On the one hand, it is thought that the present time, when labour unrest is rampant throughout the country, is peculiarly ill-fitted for the passing of such a drastic law; on the other hand, it is recognised, both by the public and by the medical profession, that the abuse of strong drink has been the cause of much disease and an unspeakable amount of suffering and misery. At the same time, it is considered by many that it would have been wiser to proceed more slowly, to restrict the facilities for procuring alcohol, to lessen the number of public-houses in the large cities, and improve the quality of the diminished number. Some of them have been important factors in corrupt municipal politics and have been centres of vice. An improvement in the housing conditions would, in the opinion of many, proportionately raise the standard of the public house. Among the various evils which (it is prophesied) prohibition will bring in its train is an increase of the drug habit. In *American Medicine*, January, 1919, it is pointed out that the sale of drugs increases *pari passu* with the decrease in the sale of alcoholic stimulants. Moreover, liquor will be procured secretly, and there will be a considerable amount of illicit manufacture of alcohol. It remains to be seen whether in America, young and impatient of delay, it is possible to make a nation sober by Act of Parliament.

Prohibition Regulations for New York.

A Bill to enforce prohibition in New York State has been drafted, in ratification of the Federal Amendment, for introduction to the New York State Legislature. The Bill contains very drastic provisions relating to the sale of alcohol by medical men and druggists. The law enacts that druggists may not sell alcohol except upon a physician's prescription, and an affidavit is required of all persons desiring to buy alcohol for mechanical, chemical, or sacramental purposes. A pharmacist's licence to sell alcohol may not be issued in any form except to druggists who have never been convicted of an illegal sale of liquor, and whose stock of alcohol in hand does not represent more than 1 per cent. of the value of all goods in his place of business. Such druggists must be of temperate habits and may not sell to any person known to be accustomed to take alcoholic beverages. Moreover, the sale of toilet, culinary, antiseptic, and flavouring extracts and patent medicines, the manufacture of which involves the payment of a United States liquor dealer's tax, is prohibited. No one but a druggist licensed to sell alcohol is permitted to sell proprietary preparations or patent medicines except on the prescription of a licensed medical man. Medical men are required to keep a record of all prescriptions issued by them for alcoholic compounds, and those allowed to issue such prescriptions must first give a bond of $2000 (£400) that they will observe the provisions of the law and are licensed by the Prohibition Commissioner.

Feb. 15th.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. W. G. Axford has been placed on the Retired List, with the rank of Surgeon Rear-Admiral, in recognition of services rendered during the war.

Surgeon Commander to be Surgeon Captain: C. M. Beadnell.

Surg. Lieut. Cdr. (Emergy.) G. H. S. Miller, R.N., granted rank of Surgeon Commander (Emergency) for services rendered during the war.

Temp. Surg. Lieut. G. W. Pool, who has been invalided on account of ill-health contracted in the Service, to retain his rank.

ROYAL ARMY MEDICAL CORPS.

Temp. and acting Major G. Taylor relinquishes his acting rank on re-posting.

Capt. W. H. S. Burney to be acting Major.

Temp. Col. S. M. Smith (Captain, R.A.M.C., T.F.) relinquishes his temporary commission on re-posting.

Late temporary Captains granted the rank of Captain: J. S. S. Steele-Perkins, J. C. King.

Temporary Lieutenants to be temporary Captains: B. Blacklock, C. H. G. Gostwyck, H. F. Hutchinson.

C. H. Lloyd to be temporary Captain.

Temp. Hon. Lieut. L. M. Earle to be temporary Honorary Captain whilst serving with the British Red Cross Hospital, Netley.

Temp. Col. W. Thorburn, A.M.S. (Lieut.-Col., R.A.M.C., T.F.) relinquishes his temporary commission on re-posting; Capt. St. J. Buxton relinquishes the acting rank of Major.

Temp. Capt. (acting Major) T. D. H. Holmes relinquishes his commission and retains the rank of Major.

Temporary Captains granted the rank of Major: E. L. M. Hackett, J. L. Gordon, B. H. Barton, S. J. Rowntree, C. A. H. Gee, R. S. Frew, H. B. Atlee, J. R. Craig.

Temporary Captains retaining the rank of Captain: W. Anderson, C. M. G. Elliott, R. M. Walker, B. W. Mosher, N. M. Keith, J. A. Matson, B. F. Bailey, J. A. Jones, W. A. L. Marriott, E. C. Gimson, C. S. Droop, R. L. Blenkhorn, A. G. Brand.

The undermentioned on ceasing to be employed with the St. John Ambulance Brigade Hospital, and retain their honorary rank:—Temp. Hon. Majors C. W. M. Hope, T. Houston; Temp. Hon. Capts. F. Coates, W. F. Matthews, F. Hall, C. E. Butterworth, J. M. McCloy; Temp. Hon. Capt. S. E. T. Shann, on ceasing to be employed with No. 5 British Red Cross Hospital, and retains the honorary rank of Captain; Temp. Hon. Capt. A. C. Inman, and retains the honorary rank of Captain; Temp. Lieut. E. Cansfield, and retains the rank of Lieutenant.

Canadian Army Medical Corps.

Temp. Major F. B. Carron to be temporary Lieutenant-Colonel.

Temp. Major W. H. Merritt to be acting Lieutenant-Colonel while employed at a Canadian Special Hospital.

Temporary Captains to be acting Majors while employed at Canadian Stationary Hospitals: V. N. Mackay, J. S. Hudson, H. C. Davis, M.C., while employed with Canadian Field Ambulance.

SPECIAL RESERVE OF OFFICERS.

Capt. (acting Major) T. Y. Barkley to be acting Lieutenant-Colonel whilst in command of a Medical Unit.

Captains relinquishing the acting rank of Major on re-posting: W. C. B. Meyer, A. A. Smalley.

Captains to be acting Majors: W. Dunlop, G. G. Jack, D. M. Lyon.

Lieutenants to be Captains: C. F. J. Carruthers, J. W. O. Fairweather, H. Roger, A. Bulleid, C. F. Rainer, A. Blackstock, L. C. Goument, W. E. Le G. Clark, A. W. Wells, T. Davies, E. B. Ash, G. W. Coombes, D. V. Halstead, J. R. Cox, M. W. Geffen.

A. St. G. J. McC. Huggett, R. Gainsborough, W. H. Palmer, from University of London Contingent, O.T.C., to be Lieutenants.

TERRITORIAL FORCE.

Major G. A. Troup to be Lieutenant-Colonel.

Major (acting Lieut.-Col.) W. D. Watson relinquishes his acting rank on ceasing to be specially employed.

Capt. J. Angus relinquishes his commission on account of ill-health contracted on active service and retains the rank of Captain.

Capt. M. B. H. Stratford relinquishes his commission on account of ill-health contracted on active service and retains the rank of Captain.

Capt. J. F. W. Wyer relinquishes his commission on account of ill-health and retains the rank of Captain.

Capt. (acting Lieut.-Col.) A. C. H. McCullagh relinquishes his acting rank on ceasing to be specially employed.

Capt. T. G. Buchanan to be acting Major whilst specially employed.

Capt. (acting Major) J. W. Cairns relinquishes his commission on account of ill-health contracted on active service and retains the rank of Major.

2nd Eastern General Hospital: Capt. H. N. Fletcher is restored to the establishment.

1st Western General Hospital: Capt. (acting Lieut.-Col.) J. M. Hunt relinquishes his acting rank on ceasing to be specially employed.

ROYAL AIR FORCE.

Lieut.-Col. T. D. C. Barry is granted the acting rank of Colonel.

Majors granted the acting rank of Lieutenant-Colonel: R. H. McGiffin, G. D. Bateman, B. R. Bickford.

Captains granted the acting rank of Major: W. Darling, J. M. Kirkness, T. S. Ripp n, B. A. Playne, P. H. Hadfield, R. H. Knowles, P. L. Moore, A. A. Atkinson, J. J. C. Hamilton, F. C. Jobson, M. R. Dobson, J. MacGregor, F. N. B. Smartt, A. A. Bisset, H. Stedman, L. C. M. Wedderburn, H. M. S. Turner, H. E. Whittingham, A. Scott-Turner, C. J. G. Taylor, O. H. Gotch, H. G. Anderson, H. A. Hewat, W. Enraght, D. Ranken.

Capt. (acting Major) C. R. Thwaites retains the acting rank of Major whilst employed as Major, from (S.O.)

P. O. Moffat (temp. Capt., R.A.M.C.) is granted a temporary commission as Captain.

Lieutenants granted the acting rank of Captain: C. H. Vernon, G. W. Harbottle, L. C. Broughton-Head.

R. H. Turner is granted a temporary commission as Lieutenant.

Capt. D. Ross is transferred to unemployed list.

URBAN VITAL STATISTICS.

(Week ended Feb. 22nd, 1919.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at 16,500,000 persons, the annual rate of mortality, which had increased from 15·0 to 27·8 in the four preceding weeks, further rose to 35·7 per 1000. In London, with a population slightly exceeding 4,000,000 persons, the annual death-rate was 34·2, or 7·0 per 1000 above that recorded in the previous week; among the remaining towns the rates ranged from 11·8 in Coventry, 16·6 in Walthamstow, and 19·1 in Enfield, to 58·9 in Blackburn, 60·5 in Bradford, 60·9 in Southport, 64·3 in Wakefield, 66·1 in Newcastle-on-Tyne, and 81·5 in West Hartlepool. The principal epidemic diseases caused 196 deaths, which corresponded to an annual rate of 0·6 per 1000, and included 46 from diphtheria, 43 from measles, 42 from infantile diarrhœa, 38 from whooping-cough, 21 from scarlet fever, and 6 from enteric fever. Measles caused a death-rate of 2·3 in Warrington and 4·4 in Middlesbrough, and whooping-cough of 1·2 in Bristol. The deaths attributed to influenza, which had increased from 222 to 1363 in the four preceding weeks, further rose to 3044, and included 653 in London, 188 in Liverpool, 163 in Newcastle-on-Tyne, 142 in Bradford, 130 in Manchester, 84 in Birmingham, and 82 in Leeds.

There were 1088 cases of scarlet fever and 1185 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 1094 and 1179 respectively at the end of the previous week. The causes of 89 deaths in the 96 towns were uncertified, of which 17 were registered in Birmingham, 16 in Liverpool, and 5 each in London, Manchester, and Gateshead.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality, which had increased from 17·0 to 32·0 in the five preceding weeks, further rose to 38·4 per 1000. The deaths from influenza numbered 75, while in 503 deaths classified as due to other conditions influenza was a contributory cause; in the previous weeks these numbers were 76 and 298 respectively. The 906 deaths in Glasgow corresponded to an annual rate of 42·2 per 1000, and included 52 from whooping-cough, 6 from diphtheria, 4 from infantile diarrhœa, and 2 each from measles and scarlet fever. The 336 deaths in Edinburgh were equal to a rate of 52·1 per 1000, and included 6 from whooping-cough, 3 each from diphtheria and infantile diarrhœa, and 1 from scarlet fever.

Irish Towns.—The 351 deaths in Dublin corresponded to an annual rate of 45·2, or 11·9 per 1000 above that recorded in the previous week, and included 88 from influenza, and 5 from infantile diarrhœa. The 218 deaths in Belfast were equal to a rate of 28·3 per 1000, and included a fatal case of infantile diarrhœa.

VITAL STATISTICS OF LONDON DURING JANUARY, 1919.

IN the accompanying table will be found summarised statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious disease it appears that the number of persons reported to be suffering from one or other of the ten diseases specified in the table was equal to an annual rate of 4·5 per 1000 of the population, estimated at 4,026,901 persons; in the three preceding months the rates had been 5·9, 4·0, and 4·2 per 1000. Among the metropolitan boroughs the lowest rates from these notified diseases were recorded in Chelsea, the City of Westminster, Hampstead, Holborn, Finsbury, and the City of London; and the highest in Stoke Newington, Bethnal Green, Stepney, Southwark, Bermondsey, and Deptford. Seven cases of small-pox were notified during the month; of these 4 belonged to St. Pancras and 3 to Battersea. The prevalence of scarlet fever was slightly less than that in the preceding month; this disease was proportionally most prevalent in Fulham, Bethnal Green, Stepney, Southwark, Deptford, and Greenwich. The Metropolitan Asylums Hospitals contained 1043 scarlet fever patients at the end of the month, against 1184, 1107, and 1087 at the end of the three preceding months; the weekly admissions averaged 128, against 178, 146, and 136 in the three preceding months. The prevalence of diphtheria was about 15 per cent. higher than in December; the greatest prevalence of this disease was recorded in St. Marylebone, St. Pancras, Stoke Newington, Hackney, Bethnal Green, Stepney, and Bermondsey. The number of diphtheria patients under treatment in the Metropolitan Asylums Hospitals, which had been 1155, 1100, and 1089 at the end of the three preceding months, numbered 1170 at the end of January; the weekly admissions averaged 164, against 169, 129, and 146 in the three preceding months. Enteric fever was slightly more prevalent than in the preceding month; of the 25 cases notified in January, 6 belonged to Stepney, 4 to Battersea, 2 to the City of Westminster, 2 to Islington, and 2 to Bethnal Green. There were 23 cases of enteric fever under treatment in the Metropolitan Asylums Hospitals at the end of the month, against 56, 33, and 23 at the end of the three preceding months; the weekly admissions averaged 3, against 9, 3, and 1 in the three preceding months. Erysipelas was proportionally most prevalent in Stoke Newington, Shoreditch, Bethnal Green, Poplar, Southwark, and Camberwell. Sixteen cases of puerperal fever were notified during the month; of these 4 belonged to Fulham and 2 to Southwark. Of the 19 cases of cerebro-spinal meningitis 3 belonged to Stepney, 2 to Fulham, 2 to Islington, 2 to Bermondsey, and 2 to Battersea; while the 3 cases of poliomyelitis belonged respectively to the City of Westminster, Poplar, and Lambeth.

The mortality statistics in the table relate to the deaths of civilians belonging to the several boroughs, the deaths occurring in institutions having been distributed among the boroughs in which the deceased had previously resided. During the five weeks ended Feb. 1st the deaths of 6036 London residents were registered, equal to an annual rate of 15·6 per 1000; in the three preceding months the rates had been 27·3, 42·3, and 18·5 per 1000. The death-rates ranged from 12·6 in Wandsworth, 12·9 in Fulham, 13·2 in Stoke Newington, 13·5 in Deptford, 13·9 in Battersea and 14·0 in Lewisham, to 17·2 in Paddington, 17·3 in Chelsea, 17·3 in Finsbury, 17·6 in Shoreditch, 18·5 in St. Marylebone, and 20·7 in Southwark. The 6036 deaths from all causes included 217 which were referred to the principal infectious diseases; of these, 14 resulted from measles, 10 from scarlet fever, 82 from diphtheria, 11 from whooping-cough, 8 from enteric fever, and 92 from diarrhœa and enteritis among children under 2 years of age. No death from any of these diseases was recorded during the month in the City of London and in Greenwich. Among the metropolitan boroughs the lowest death-rates from these diseases were recorded in Hammersmith the City of Westminster, Holborn, Battersea, Wandsworth, and Lewisham; and the highest death-rates in Fulham, Chelsea, St. Marylebone, Stoke Newington, Hackney, Shoreditch, and Bethnal Green. The 14 deaths from measles were 126 below the average number in the corresponding period of the five preceding years, and included 4 in Chelsea, 3 in Camberwell, and 2 in Kensington. The 10 fatal cases of scarlet fever were half the average number; of these, 3 belonged to Lambeth and 3 to Deptford. The 82 deaths from diphtheria were 7 above the average; this disease was proportionally most fatal in Paddington, St. Marylebone, Stoke Newington, Hackney, and Bermondsey. The deaths from whooping-cough numbered 11, and were 93 below the average; of these, 3 belonged to Woolwich and 2 to Islington. The 8 fatal cases of enteric fever were 3 below the average number. The 92 deaths from diarrhœa and enteritis among children under 2 years of age agreed with the average; the greatest proportional fatality from this disease occurred in Kensington, Fulham, St. Marylebone, Shoreditch, Bethnal Green, and Southwark. In conclusion, it may be stated that the aggregate mortality from these principal infectious diseases in London during January was 51 per cent. below the average.

ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING JANUARY, 1919.

(*Specially compiled for* THE LANCET.)

CITIES AND BOROUGHS.	Estimated civil population, 1917.	Notified Cases of Infectious Disease.											Deaths from Principal Infectious Diseases.								Deaths from all causes.	Death-rate per 1000 living.
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever.	Erysipelas.	Cerebro-spinal meningitis.	Poliomyelitis.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Enteric fever.	Diarrhœa and enteritis (under 2 years)	Total.	Annual rate per 1000 persons living.		
LONDON	4,026,901	7	683	817	—	25	1	16	184	19	3	1755	4·5	—	14	10	82	11	8	92	217	0·6	6036	15·6
West Districts:																								
Paddington	122,507	—	14	23	—	1	—	—	2	—	—	40	3·4	—	—	—	4	1	—	3	8	0·7	202	17·2
Kensington	151,535	—	24	25	—	—	—	—	4	1	—	54	3·7	—	2	—	—	—	—	7	9	0·6	239	16·4
Hammersmith	114,962	—	17	22	—	—	—	—	6	1	—	46	4·2	—	—	—	3	—	—	—	3	0·3	163	14·8
Fulham	145,186	—	42	20	—	1	—	4	4	2	—	73	5·2	—	1	—	2	—	1	10	14	1·0	180	12·9
Chelsea	57,368	—	5	3	—	—	—	—	1	—	—	9	1·6	—	4	—	—	1	—	—	5	0·9	95	17·3
City of Westminster	122,046	—	7	12	—	2	—	1	3	—	1	27	2·3	—	—	—	2	—	—	1	3	0·3	168	14·4
North Districts:																								
St. Marylebone	92,796	—	9	29	—	—	—	1	3	1	—	43	4·8	—	1	—	4	—	—	4	9	1·0	165	18·5
Hampstead	75,649	—	9	12	—	1	—	—	1	—	—	23	3·2	—	—	—	—	—	—	3	3	0·4	113	15·6
St. Pancras	186,600	4	21	57	—	1	—	1	12	1	—	97	5·4	—	—	—	4	—	—	7	11	0·6	285	15·9
Islington	297,102	—	43	49	—	2	—	—	14	2	—	110	3·9	—	—	—	7	2	—	4	13	0·5	461	16·2
Stoke Newington	47,426	—	6	17	—	—	—	—	4	—	—	27	5·9	—	—	—	4	—	—	—	4	0·9	60	13·2
Hackney	196,598	—	31	63	—	1	—	1	8	—	—	104	5·5	—	—	1	14	—	—	3	18	1·0	323	17·1
Central Districts:																								
Holborn	35,303	—	—	10	—	—	1	—	—	—	—	11	3·2	—	—	—	1	—	—	—	1	0·3	52	15·4
Finsbury	68,011	—	7	10	—	—	—	—	4	—	—	21	3·2	—	—	—	—	1	—	2	3	0·5	113	17·3
City of London	16,138	—	—	2	—	—	—	—	—	—	—	2	1·3	—	—	—	—	—	—	—	—	—	22	14·2
East Districts:																								
Shoreditch	89,675	—	11	17	—	—	—	—	8	—	—	36	4·2	—	1	—	2	—	1	4	8	0·9	151	17·6
Bethnal Green	107,362	—	33	38	—	2	—	1	10	—	—	84	8·2	—	—	1	1	—	1	6	9	0·9	156	15·2
Stepney	232,010	—	59	73	—	6	—	1	13	3	—	155	7·0	—	—	—	5	1	—	7	13	0·6	347	15·6
Poplar	143,443	—	20	23	—	1	—	—	11	1	1	57	4·1	—	—	—	3	—	1	4	8	0·6	219	15·9
South Districts:																								
Southwark	167,936	—	46	34	—	—	—	2	12	—	—	94	5·8	—	—	—	4	—	—	8	12	0·7	334	20·7
Bermondsey	107,635	—	21	40	—	1	—	1	—	2	—	65	6·3	—	—	—	4	—	—	3	7	0·7	153	14·8
Lambeth	272,038	—	46	37	—	1	—	—	10	1	1	96	3·7	—	—	3	2	—	1	7	13	0·5	419	16·1
Battersea	150,023	3	23	18	—	4	—	—	5	2	—	55	3·8	—	1	—	1	—	1	1	4	0·3	200	13·9
Wandsworth	300,787	—	43	43	—	—	—	1	11	—	—	98	3·4	—	—	—	7	—	—	3	10	0·3	363	12·6
Camberwell	239,461	—	32	50	—	—	—	—	17	1	—	100	4·4	—	3	1	4	1	—	3	12	0·5	362	15·8
Deptford	103,527	—	14	28	—	—	—	—	5	—	—	87	8·8	—	—	3	1	—	1	—	5	0·5	134	13·5
Greenwich	90,440	—	23	13	—	1	—	1	4	—	—	42	4·8	—	—	—	—	—	—	—	—	—	148	17·1
Lewisham	161,405	—	18	24	—	—	—	—	9	—	—	51	3·3	—	1	—	1	1	—	1	4	0·3	216	14·0
Woolwich	131,942	—	19	25	—	—	—	1	3	—	—	48	3·8	—	—	1	2	3	1	1	8	0·6	193	15·3
Port of London	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Including membranous croup.

Correspondence.

"Audi alteram partem."

THE ESSENTIAL PRINCIPLES OF SUCCESSFUL MEDICAL ADMINISTRATION.

To the Editor of THE LANCET.

SIR,—Carlyle has said that the most important fact about a man is his religion. We may safely broaden this statement by saying that the most important facts about any human policy are the principles which underlie it. In the present crisis of the fortunes of medicine it will be calamitous if we fail to realise this paramount importance of principles.

The essential principles of successful medical administration may be thus enunciated:—

1. The utmost possible *freedom* must be assured to the practice of medicine in all its departments.

2. Adequate standards both of general *education* and professional knowledge must be required on entry to the profession.

3. The *control* of medicine must be by adequately educated minds; medicine must have a sufficient voice in its own control, together with sufficient authority in all matters entrusted to it; and disciplinary powers over professional practice must be primarily in medical hands.

4. Reasonable *remuneration*, *holiday*, and *leisure* must be assured to all members of the profession.

Let me deal with these briefly. There is nothing new about any of them. All have been before the profession for years. THE LANCET has, at one time or another, voiced them all.

1. *Freedom.*

To insist upon the value of freedom, when so lately millions have laid down their lives for it, might seem unnecessary were it not that intelligent persons are advocating a wholesale surrender of the independence of the entire British medical profession. For that is just what the acceptance of universal whole-time medical State service would mean. No art or science has long flourished after it has been deprived of freedom, and Buckle has well put the reason for this: "It is certain that men who begin by losing their independence will end by losing their energy." The whole history of medicine illustrates this truth. Illustrations of it are even now under our eyes. There will be no excuse of want of warning if, from defect of manhood or neglect of national duty, we allow our liberty to be taken from us. How then, in a great scheme of medical administration, is this essential freedom to be preserved? There are certain sections of medical work which cannot be carried out otherwise than as whole-time State service, and the question naturally arises: "Will not that be injurious?" The answer is: "No, so long as the mass of medicine is free to create the atmosphere of medical liberty." It is whole-time State service of *the mass* which would be so pernicious in its effects. In the existing whole-time appointments of the Public Health Service we have had an illustration of the protecting influence of a free mass of medicine. But such sections will need safeguards.

The first of such services is the Public Health Service. None can deny that the work of this Service has already been admirable. But few will dissent when it is asserted that its medical officers should be made independent of interested local influences. Its reorganisation as a whole-time State service under a Minister of Health will be in reality a liberation from undesirable control. Its removal from a subordinate position in an alien Ministry, such as the Local Government Board, will be a further liberation. The administrative officers of the military services must also form whole-time services. But the experience of the war will leave few in doubt of the necessity of liberating the Army Medical Service from excessive military control and of bringing it more fully into touch with the civil profession by making it medically responsible to a civil Ministry of Health. Only thus can the profession guard against the repetition of misfortunes which have flowed from two causes (the traditions of an alien control), viz., attention to "forms" rather than to patients and to "seniority" rather than to science.

For adequate freedom of the mass of medicine the other three principles just enumerated are clearly essential, and the following would seem to be necessary conditions:

1. Free choice of doctor by patient and patient by doctor as the best means of maintaining the very peculiarly human relationship of doctor and patient so vitally essential to getting the best out of clinical work. 2. The existence of a considerable proportion of medical men, as now, in "private practice," outside the State services. 3. Wherever State service is needed, and the choice is possible, the adoption of part-time service instead of whole-time service. 4. Probably payment by piecework or per patient in State clinical work rather than any more inclusive system of State contract.

Whether or not institutions now admittedly working well outside State service, like our voluntary hospitals, should be touched by the State is a question needing the most serious thought, but if their medical officers should come to be paid by the State it would seem essential that their service should be only part-time. Part-time State service would also meet the case of the clinical teachers of medicine. Directed by a Ministry of Health, part-time State service seems the only practicable plan for the much-needed reform of the present panel system. Part-time State service under a Health Ministry, in fact, for the bulk of such departments of medicine as come under the State, is probably the best solution of the problem of State control.

2. *Education.*

The standard of preliminary general education required of the doctor has now for some years been practically the same as that for the veterinary surgeon or for the pharmaceutical chemist; and the public, which has a nice discrimination in matters of education, has rated us up, all three, as being on practically the same level of culture. The technical education at the same time has grown so cumbersome as to seriously need revision. This revision, both of technical and general standards, together with the establishment of their uniformity throughout the United Kingdom, must be dealt with by a State Medical Committee predominantly representing the nation and the profession at large, and including not merely medical men, but representatives of the chief general educational authorities in the country. The faults of the General Medical Council, however, it should be noted, reside, not in the able and honourable men who compose it, but in its peculiarly limited powers.

3. *Educated Control.*

Every department of State, be it Naval, Military, or Medical, must be under the control of the community; therefore the control of medicine must be as much in lay hands as the control of the Navy or Army. But no more than the control of the Navy or Army must the control of medicine be in imperfectly educated hands. I yield to no one in my admiration and regard for the average British fighting man, whose superb qualities, alike in defeat and victory, this war has once more illustrated. But it is neither for his good, nor for the good of the nation, that, without special education, he should be charged with the control of so complex and vital a national organ as medicine. Outside Russia one does not convene committees of able-seamen or private soldiers to give directions to admirals and generals. His unfighting fellows, who displayed at home such senseless selfishness at critical periods of the war, gravely imperilling the victory of the Allies, are manifestly unfit for such responsibility. The administration of medicine, then, must be in the hands of well-educated men, and, amongst these men, capable and trustworthy representatives of the profession must form a sufficient minority. The Minister himself should be a medical man, because no other can properly voice to the Cabinet, Parliament, and the public the medical requirements of the country.

4. *Reasonable Remuneration, Holiday, and Leisure.*

However self sacrificing an industry may be (and none has been more self-sacrificing than ours), a limit exists below which inadequate remuneration must spell a decline in efficiency. That limit has been long passed for medicine. What a man may reasonably claim as his minimum payment for public service is a sufficiency to maintain himself and his family in health and vigour (needing reasonable holiday and leisure), to educate his children for work as responsible as his own, to make provision for his old age, and to provide an insurance for his dependents against his death or disablement. How many doctors get this? Yet they are all entitled to it and, if they could only cultivate enough mutual loyalty, they could obtain it.

I am, Sir, yours faithfully,

Exeter, Feb. 17th, 1919. WILLIAM GORDON.

PREVENTIVE INOCULATION AGAINST INFLUENZA.

To the Editor of THE LANCET.

SIR,—I think that the official Memorandum on Prevention of Influenza just issued by the Medical Department of the Local Government Board casts an unmerited slur on the value of protective inoculation. I have had the opportunity of carrying out inoculation on a large scale and the results have been most satisfactory. Out of 1100 subjects about 800 were inoculated in November and December, and the figures at the end of January were as follows:—

Incidence among inoculated	0·5 per cent.
,, non-inoculated ...	10·0 per cent.
Death-rate of inoculated cases ...	Nil.
,, non-inoculated	19 per cent.

Since the above date I have heard of another death among the non-inoculated.

In my opinion, inoculation can do no harm at the worst, almost certainly has a protective influence against infection, and certainly diminishes the risk of pulmonary complications.

I am, Sir, yours faithfully,

Birchin-lane, E.C., Feb. 24th, 1919. C. W. WIRGMAN.

COMMERCIAL VACCINE LYMPHS.

To the Editor of THE LANCET.

SIR,—My experience is very different from that of Mr. E. A. Barton (THE LANCET, Feb. 22nd, p. 313). I was public vaccinator for 30 years and the payment depended upon results—viz., four successful vesicles. I found that the Local Government Board vaccine was not to be relied upon, and I therefore always used Dr. Chaumier's lymph, with such good results that I received four vaccination grants during my period of office. In 1902 I vaccinated or re-vaccinated some 2000, every one successful. Of course, I do not know the present virtue of the vaccine.

I am, Sir, yours faithfully,

Chelston, Devon, Feb. 22nd, 1919. A. T. ROWORTH.

THE DISCUSSION ON SHOCK AT THE ROYAL SOCIETY OF MEDICINE.

To the Editor of THE LANCET.

SIR,—In THE LANCET report of the recent discussion on shock at the Royal Society of Medicine, from the variety of the opinions expressed, it is evident that there is, as yet, no general agreement in regard to the problem of the "missing blood." This problem is not solved by the assumptions of the speaker who stated that:—

"It is clear that blood must be accumulated or held up somewhere or other in dilated regions of the vascular system. Observations made in the course of abdominal operations give no support to the view that there is any significant degree of dilatation of the arteries or veins of the splanchnic area. The region in question must therefore be that of the capillaries."

It is unsafe to assume that the missing blood must still be in some part of the vascular system, and it by no means follows that, because this blood is not in the splanchnic area, it must be in the capillaries. Very far from convincing is the same speaker's explanation of how blood can accumulate in capillaries without producing cyanosis.

"As regards the absence of marked cyanosis in shock, we must remember that a very small dilatation of the capillaries, if widely distributed, may suck up a large volume of blood."

Scepticism is justifiable in regard to the clinical existence of an accumulation in the capillaries of blood sufficient in amount to be an important factor in shock and yet so widely distributed as to fail to cause cyanosis. Clinically the picture of shock is that drawn by Mr. John D. Malcolm—i.e., a contracted vascular system, a reduced capacity of the whole vascular area, and a diminution of the volume of blood in this area. The problem of the blood deficiency appears to be a question not so much of missing blood as of missing blood fluids, the total volume of the blood being diminished by the escape of blood fluids from the vascular system.

Might not laboratory workers, instead of looking for the missing blood in some part of a vascular system whose cubic capacity is greatly diminished, with advantage turn their attention to locating the missing blood fluids?

I am, Sir, yours faithfully,

Plymouth, Feb. 19th, 1919. C. HAMILTON WHITEFORD.

The War and After.

THE CENTRAL MEDICAL WAR COMMITTEE: THE INTERESTS OF THOSE WHO HAVE BEEN ON SERVICE.*

THE steps which have been taken by the Central Medical War Committee for the members of the medical profession who have been on service have been made the subject of a brief statement of the General Purposes Subcommittee. It may be remembered that Local Medical War Committees were instituted to protect the interests of medical men serving, to coöperate in the choice of those who should serve, and to provide for their medical work during their absence, the organisation areas of the British Medical Association being employed for the purpose. The Local Committees arranged a general agreement, under which half fees would be paid over by the practitioner remaining behind to the medical man on service, the patient to be handed back on return from service. Further, it was generally agreed that the substitute medical man should not attend the original patients of a medical man, who had been on service, for one year from the original doctor's return.

In two other directions was an attempt made to safeguard the position of those on service: regulations under the Insurance Act were made abrogating during the war the right of insured persons to change from the list of an absent doctor; all Government Departments consented to approve the making of only temporary appointments during the war.

With regard to the position after demobilisation, a scheme was laid down which provided for priority on personal grounds, the primary consideration being length of service.

The statement continues as follows:—

In December last the Committee wrote to all the Government Departments which have medical work at their disposal urging that preference should, wherever possible, be given to doctors who have served. The Committee emphasised the need for this work being available during the first few months after the demobilised doctor's return, while he was building up his practice. The War Office, the Ministry of Pensions, the Ministry of National Service, and the Local Government Board all expressed their cordial agreement with this principle, and promised their support.

At the same time the L.M.W.C.s were informed of this step and were asked to help any man to secure such work who, on his return, expressed his desire for it. It was pointed out that vacancies should be made wherever necessary by the retirement of those who now hold the posts but who have done no service.

Any doctor who now returns and who wishes for local work of this kind should apply: (*a*) for military work to the D.D.M.S. of the Command, stating his service, and asking to be given any local work which may be available; (*b*) to the secretary of the L.M.W.C. (name and address will be supplied on application) asking that the name of the applicant be placed on the list of those available for Pensions Boards or any similar work for which local practitioners are being employed.

So far as whole-time appointments are concerned, with the exception of an uncertain number which will be made by the Ministry of Pensions, the Committee knows of none except those connected with the local public health and education authorities. The latter are advertised in the medical journals, and the Central Government Departments concerned are being asked to press on the local authorities the necessity for stating that men who are on service may apply, though they have not yet been demobilised. Application should be made to the Ministry of Pensions for information about pensions medical appointments. Many applicants seem to be under the impression that the Ministry of National Service and the Ministry of Health have, or may shortly have, numbers of appointments of an administrative kind. There is no reason for this belief. The Ministry of National Service is shortly coming to an end, while the Ministry of Health is not yet in existence.

The experience of the Committee goes to show that doctors who return to civil life should have little difficulty in finding work, though it may be difficult for them to find just the kind of work they would prefer. Before the war the annual normal supply of doctors was hardly keeping pace with the demand, so there is little doubt that for some years to come there will be work for all. For five years the normal supply of fresh blood for the profession has been flowing into the services; consequently there are now many openings in all kinds of practice, but particularly, of course, in general practice. Moreover, during the years of the war

the death-rate of the profession, both in and out of the services, has been higher than normal, and there are many doctors who in the ordinary course would have retired from practice, but who have carried on and are now anxious to be released. The Committee must refer men who are on the look-out for such openings to the usual channels—the deans of medical schools, the columns of the medical journals, and the advertisements of medical agents.

The Committee has borne in mind the post-graduate training of medical men who have served, and the question of the retention of commissions and pay during such courses is under consideration.

Arrangements have also been made by the Fellowship of Medicine with the medical schools in London for an emergency post-graduate course of three months for qualified medical men belonging to the Medical Services of the Royal Navy, Army, Air Force, the Overseas contingents, the United States, and Allies. Officers joining the course will be admitted to the general practice of the hospitals, including the clinical work of the wards and out-patient departments, clinical lectures and demonstrations, post-mortem demonstrations, and laboratory work. Tickets for the whole course or for two or three months are issued at the rate of £3 10*s.* for each month. Particulars can be obtained from the Secretary of the Fellowship, 1, Wimpole-street, London, W.1.

With respect to financial assistance the statement of the General Purposes Subcommittee of the Central Medical War Committee runs as follows:—

War Emergency Fund of the Royal Medical Benevolent Fund.
Hon. Sec., Major G. Newton Pitt,
11, Chandos-street, Cavendish-square, W.

This Fund is prepared to give grants in respect of rent, insurance, taxes, family maintenance, and education. The circumstances should be stated to the hon. sec., in a letter marked "Confidential," and applicants need not be deterred by the fear of publicity. The application is investigated by one member of the committee and laid before the executive committee anonymously. Nor need applicants be deterred by any feeling that they are asking for "charity." A considerable sum has been subscribed, mainly by members of the medical profession, and it was intended to be used, and will be used, to help men who need such assistance either during their term of service or on their return without any question of "charity."

Civil Liabilities Committee.—Grants of not more than £104 per annum can be made to officers or ex-officers of rank not above Captain to meet serious hardship due to (*a*) rent; (*b*) interest, instalments on loans, including mortgages; (*c*) instalments on purchase of house or furniture; (*d*) taxes; (*e*) rates; (*f*) insurance; (*g*) school fees; (*h*) maintenance of children.

Forms of application may be had from Army Agents or from Military Service (C.L.) Committee, Imperial House, Kingsway, W.C.

THE CASUALTY LIST.

The names of the following medical officers appear among the casualties announced since our last issue:—

Died.

Lieut. W. M. Crombie, I.M.S., was a student at St. Thomas's Hospital, London, and qualified in 1916. After holding an appointment at St. Thomas's Hospital he joined the R.A.M.C. and later the I.M.S.

Capt. J. J. Dwyer, D.S.O., R.A.M.C., qualified in Ireland in 1909 and held appointments at the West Kent General Hospital, Maidstone, and at the Chelsea Hospital for Women. Prior to joining the R.A.M.C. he was in practice in Brompton-square, London. He died at Calais from pleurisy.

CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualties among the sons of medical men are reported:—

Second Lieut. J. G. Grant, Liverpool Scottish Regiment, died at Banchory of illness contracted on active service, son of the late Dr. Grant Bey, of Cairo and Aberdeen.

U. G. Murray, died from pneumonia following influenza whilst doing duty at a Y.M.C.A. hut at Winchester, eldest son of Temp. Col. G. R. Murray, A.M.S., of Bowdon, Cheshire.

Lieut. W. M. Crombie (see above), who died in London from influenza contracted in Baghdad, was the eldest and only surviving son of the late Dr. J. Crombie, of Sidcup.

THE Municipal Council of the City of Dublin has made "epidemic influenza" and "septic pneumonia" compulsorily notifiable as an emergency measure for a period of six months.

Obituary.

HARRY BLAKEWAY, B.Sc., M.S. LOND., F.R.C.S. ENG.,

RESIDENT ASSISTANT SURGEON, ST. BARTHOLOMEW'S HOSPITAL.

INFLUENZAL pneumonia has claimed another member of the staff of St. Bartholomew's Hospital. Harry Blakeway was the son of James Blakeway, of Stourbridge, and was educated in his native town before coming up to a brilliant career in London University. Having determined to spare no pains in preparing himself for a medical career, he started by taking a science degree in 1905. After carrying off most of the prizes and scholarships available to students at St. Bartholomew's Hospital, he qualified M.B., B.S. in 1908 and took the highest distinctions in surgery at the University and at the Royal College of Surgeons of England two years later. In conformity with a usual practice, he became house surgeon to the Great Northern Central Hospital before returning to his own school, where he was successively house surgeon, demonstrator of anatomy, surgical registrar, temporary assistant surgeon, finally occupying the emergency war-time post of resident assistant surgeon. Of his occupancy of this post a colleague (R.M.V.) writes:—

"During the last years of Blakeway's life he was one of those to whose lot it fell to remain out of the hustle and turmoil and interest of the war, and he laboured unceasingly and untiringly at the less glorious but none the less essential work in the school of his adoption as resident assistant surgeon. Much of the weight of the civilian practice of the hospital fell on his shoulders and he worked nobly and well to maintain the high standards of the past."

This appointment left him but little time to work at the surgical diseases of children and the treatment of hernia, subjects in which he took peculiar interest, but he was surgeon in charge of out-patients at Victoria Hospital for Children and assistant surgeon to the City of London Truss Society. Blakeway's signed writings are limited to a number of brief but well-digested papers on surgical topics, including his Hunterian Lecture on the Operative Treatment of Cleft Palate delivered in 1915; but he was widely read in surgical literature and was a valued author of unsigned reviews in our own columns.

His early death after a career of strenuous work in which he attained to a high degree of professional skill and ability is a severe loss to St. Bartholomew's Hospital and to surgical practice as a whole. Although for Blakeway work was its own reward and he laboured for no other, his friends must regret that he did not live to reap the benefit of years of unending toil. In him surgery has lost a straight and earnest disciple, and his colleagues mourn a good and genial friend. He leaves a widow and three children, to whom we tender our heartfelt sympathy.

CHARLES M. BENSON, M.D. DUB., F.R.C.S. IREL.,

SURGEON TO SIR PATRICK DUN'S HOSPITAL, DUBLIN.

WE regret to announce the death of Mr. Charles Molyneux Benson, which occurred at his residence, 72, Lower Baggot-street, Dublin, on Feb. 16th from pneumonia following influenza. Mr. Benson, who was only 41 years of age, was a son of Sir Ralph Benson, a member of the Indian Civil Service, and received his professional education at Trinity College, Dublin, and the Royal City of Dublin Hospital. He was appointed assistant surgeon to Sir Patrick Dun's Hospital some ten years ago, and succeeded the late Sir Charles Ball as surgeon in 1916. He served in the Royal Army Medical Corps in France in 1917–18. He had been for several years secretary to the Council of the Royal College of Surgeons in Ireland, a post which brought him into official contact with all branches of his profession. And few medical men in Dublin had gained more fully the personal esteem of his colleagues. Modest and unassuming, of a high sense of honour and professional rectitude, his manner was the spontaneous expression of his kindly and frank spirit. The sympathy of his colleagues goes whole-heartedly to his widow and young children.

QUEEN'S UNIVERSITY, BELFAST.—Colonel Thomas Sinclair, C.B., professor of surgery, has been elected registrar of Queen's University, Belfast, in place of Professor J. Symington, resigned.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

The Ministry of Health Bill.

THE House of Commons on Wednesday, Feb. 26th, gave a second reading to the Ministry of Health Bill. The debate extended over the whole of the sitting, and, speaking broadly, the reception given to the measure was most favourable. Formal permission was given to the Committee which will deal with the Bill to extend it to Ireland. A separate Bill will now be introduced for Scotland.

The Evils of Unqualified Dental Practice.

The Report of the Committee appointed by the Lord President of the Council to inquire into "the extent and gravity of the evils of dental practice by persons not qualified under the Dentists' Act" has been presented to Parliament during the week and is now publicly circulated. It may be remembered that the Committee, which was presided over by the Right Hon. F. D. ACLAND, and included among its members Mr. C. S. TOMES, Sir ARTHUR NEWSHOLME, and Sir GEORGE NEWMAN, had for its terms of reference to inquire into: (1) the causes of the present inadequate supply of qualified dentists; (2) the expediency of legislation prohibiting unqualified practice; and (3) the practicability of modifying the existing course of study, diminishing the time and cost involved in training, without impairing efficient practice. The Report claims for dentistry the position of being one of the chief, if not the chief, means for preventing ill-health, and marshals clearly the powerful arguments for alike increasing the supply of qualified dentists and minimising the evils arising from quackery.

HOUSE OF COMMONS.

WEDNESDAY, FEB. 19TH.

Ireland and the Ministry of Health.

Major ASTOR (Parliamentary Secretary to the Local Government Board) informed Mr. LYNN that the Chief Secretary for Ireland was proposing on the following day to confer with honourable Members interested in regard to the application of the Ministry of Health Bill to Ireland.

Rabies in Devon and Cornwall.

Answering Mr. CAREW, Sir A. GRIFFITH-BOSCAWEN (Parliamentary Secretary to the Board of Agriculture) said: At present the outbreak of rabies in Devon and Cornwall cannot in any sense be said to be stamped out. The disease may show itself at any time within six months of its inception. The last case was confirmed on Feb. 11th, and, in addition, there is still a number of suspected cases under investigation by the Board's Veterinary Department. The total number of cases confirmed by the veterinary officers of the Board to date is 118—Devon 94, Cornwall 24. The Board has reason to think that the responsible local authorities are carrying out their duty as efficiently as their staff permits. I am informed that to date 18 civilians, 2 soldiers, and 1 sailor have been bitten and undergone the Pasteur treatment for hydrophobia.

Mr. LAMBERT: Can the honourable gentleman say whether generally rabies in these two counties is decreasing or increasing?—Sir A. GRIFFITH-BOSCAWEN: On the whole, it has been better recently, but it is by no means stamped out.

Medical Treatment of Discharged Soldiers.

Replying to Mr. DEVLIN, Sir J. CRAIG (Parliamentary Secretary to the Ministry of Pensions) wrote: In Great Britain all men, whether insured or not, who are invalided from the forces or certified on demobilisation to be impaired in health by reason of their service, are entitled to free medical benefits under the National Insurance Acts—that is, to the services of a general medical practitioner and the supply of medicines, except in the case of uninsured men whose total income exceeds £160 a year. There is no medical benefit under the Insurance Acts in Ireland, but by special arrangements with the Irish Insurance Commissioners, which came into force in October, 1918, provision similar to the above was extended to Ireland, so far as invalided men are concerned, and the question of extending the arrangements to men in impaired health on demobilisation is at present under consideration.

Accommodation for the Mentally Deficient.

Mr. HERBERT asked the Home Secretary whether he was aware of the inadequate accommodation for mentally deficient persons throughout the country; and whether he would direct the Board of Control to exercise their powers under the Mental Deficiency Act, 1913, to provide suitable homes for those mentally deficient persons whose neglected supervision was likely to be a danger to the community.—Mr. SHORTT answered: The answer to the first part of the question is in the affirmative. The provision of accommodation for mental defectives under the Act of 1913 rests with the local authorities, and has necessarily been largely suspended during the war. The Board of Control is, however, fully alive to the urgent need for further accommodation, and a circular letter to local authorities on the subject will be issued in a few days.

THURSDAY, FEB. 20TH.

Supply of Spirits.

In reply to Colonel ASHLEY, who asked whether the inhabitants of the districts round Preston were unable to obtain spirits in cases of sickness, especially in the case of influenza and pneumonia, when the same was prescribed by the local medical men and a medical certificate given, Mr. MCCURDY (Parliamentary Secretary to the Ministry of Food) said: In view of the limited supplies available, it was found impracticable to carry out the arrangement contemplated with reference to the supply of spirits to specific districts on medical grounds. The whole question of the release of spirits is now before the War Cabinet.

Assistant Medical Officers of Asylums.

Sir WATSON CHEYNE asked the Home Secretary whether he was aware that assistant medical officers of asylums were not allowed to marry, and if so, whether that rule would be rescinded.—Mr. SHORTT replied: Any rules governing the conditions of service of medical officers of asylums are made by the visiting committees who manage the asylums and appoint the officers. I am informed that there is no general rule preventing the marriage of assistant medical officers, but the possibility of the marriage of assistant medical officers is largely dependent on the nature of the residence provided for them at the asylums, and in the large majority of cases the accommodation is only suitable for an unmarried officer. The Board of Control have used their influence in the direction of securing the provision of such accommodation as will enable the senior assistant medical officer, and in large asylums the second assistant medical officer, to marry. Separate houses have been provided with this object in the grounds of some ten county asylums, including four of those belonging to the London County Council.

Influenza.

Mr. RAMSDEN asked the President of the Local Government Board whether his department was in possession of information based on experience in other countries showjng any efficacious means of dealing with the persistence of influenza; and whether any definite statement could be made as to the value of inoculation.—Dr. ADDISON replied: Reports and publications issued in other countries regarding the prevention of influenza are specially collected and considered in the Local Government Board's Medical Department. In answer to the second part of the question, I may refer the honourable Member to the Memorandum I have already promised to publish this week.

Mr. NEVILLE CHAMBERLAIN asked whether the right honourable gentleman was aware that one of the principal causes of the loss of life in the influenza epidemic had been the lack of trained nurses; whether his attention had been called to the fact that there were in France and Egypt a large number of nurses who had little or nothing to do, but who had not been demobilised because they had no fixed employer who could apply for them; and whether, in view of the renewed epidemic of influenza, he would make representations to the Secretary for War to have some of these nurses released at once.—Dr. ADDISON answered: I am aware that one of the principal needs in the medical treatment of influenza is competent nursing, and I am referring the proposal made in my honourable friend's question to the authorities responsible for demobilisation. The honourable Member is aware that local authorities and nursing associations, and not the Local Government Board, are responsible for the provision of nursing facilities.

Glen Lomond Sanatorium.

Colonel Sir A. SPROT asked the Secretary for Scotland whether, in view of the importance of the treatment of tuberculosis, he would take the necessary steps to have the sanatorium at Glen Lomond, which was established by the counties of Fife, Kinross, and Clackmannan as a tuberculosis sanatorium, but was now occupied by the War Office, restored to the local authorities without further delay.—Mr. MUNRO answered: Arrangements are being made in consultation with the War Office with a view to the early restoration of this sanatorium to the local authorities.

MONDAY, FEB. 24TH.

Demobilisation of Panel Practitioners.

Sir KINGSLEY WOOD asked the Parliamentary Secretary to the Local Government Board to state the number of medical men on the panel lists on the date of the signing of the

armistice and the number of doctors who had been demobilised since that date; and what steps he was taking to secure a more efficient medical service for insured persons by obtaining an early demobilisation of medical men.—Major ASTOR replied: The number of practitioners working for the Insurance Committees in England on Oct. 1st, 1918, was 8084, besides a certain number holding commissions in the R.A.M.C. who were free to do some part-time work for their Committee. Since Nov. 11th the number of insurance practitioners on panels in England who have been notified to the Commissioners by the War Office up to Feb. 21st as definitely released from service is 647. In reply to the last paragraph of the question I must remind the honourable Member that the responsibility for arranging with the Military, Naval, and Air Force authorities for the demobilisation of doctors needed for the civil population rests with the Ministry of National Service. My Department makes periodical representations to that Department for expediting the rate of release of doctors for civil needs and for securing the release of particular doctors required for specially urgent necessities in individual areas. The Commissioners are in constant communication with the various Insurance Committees as to the needs of their areas in this respect. I am sending the honourable Member copies of circulars addressed to these Committees which will explain the procedure adopted since the armistice.

Influenza.

Answering Sir KINGSLEY WOOD, who asked a question bearing on the measures taken to circumscribe the infection of the present influenza epidemic, Major ASTOR said: It is, of course, desirable to circumscribe infection as far as practicable, and as to the various measures which may be adopted, perhaps I may refer to the Memorandum on influenza which has been prepared by the Medical Department to the Local Government Board and issued last week. The Board's medical officers advise that notification of all cases throughout the country at the present time would not provide an effective means of controlling the spread of the disease and that any advantages which such notification would have would be outweighed by the additional burden placed on medical men and health officials. Influenzal pneumonia has, however, been made notifiable as from March 1st, with the special object of enabling assistance to be given in cases of need of nursing or home assistance which local authorities can provide or assist in providing. It is possible that influenza may be spread by handling articles of food and drink, but it does not seem practicable to remove this risk by legislative action.

Discharged Tuberculous Soldiers.

Lieutenant Colonel RAW asked the Leader of the House whether he would arrange for a Select Committee to be appointed to consider the best means of giving immediate treatment to ex-service tuberculous soldiers and sailors.—Mr. BONAR LAW replied: The Government is already considering the best means of carrying out what my honourable and gallant friend has in view.

TUESDAY, FEB. 25TH.

Demobilisation of Medical Men.

Viscount WOLMER asked the Secretary for War whether it was a fact that among the medical officers now serving with the armies of occupation there were a number of obstetric surgeons and recognised specialists in infant welfare; and, if so, whether he would give instructions that these officers should be speedily demobilised so that their special knowledge should find wider scope than was likely in their present employment.—Mr. CHURCHILL replied: Individual medical officers are demobilised at the request of the Ministry of National Service, and the selection does not rest with the military authorities. I may add, however, that the rate at which doctors of all kinds are being demobilised is by no means satisfactory, and I have given directions which I trust will result in a substantial acceleration.

Medical Men and Income-tax.

Sir WATSON CHEYNE asked the Secretary of State for War whether he had given personal consideration to the claim of medical men who, without holding commissions in the Army, had been and were engaged under the War Office in service in Army hospitals to the special service rate of income-tax; whether that claim was to be conceded; and, if not, on what specific ground was it refused.—Captain GUEST (who replied) said: So far as the War Office is concerned this is a question of complying with the law and the action taken has been based on legal advice.

Sir WATSON CHEYNE asked whether the War Office would not bear the costs of a test case.—Captain GUEST: That seems rather to be a matter for the Treasury.

Spirits for Medical Use.

Colonel ASHLEY asked the Leader of the House why the promise made by the Government in November and December last that spirits should be released for use in case of sickness when ordered by a medical man had not been carried out.—Mr. BONAR LAW replied: I am glad to say that the Cabinet have decided that spirits shall now be released up to 75 per cent. instead of 50 per cent. of the quantities released in 1916 and that considerable additional quantities will therefore be available.

WEDNESDAY, FEB. 26TH.

Ministry of Health Bill (Second Reading).

Dr. ADDISON (President of the Local Government Board), in moving the second reading of the Ministry of Health Bill, said that at present our practice was behind our knowledge, and he wished to have them in accord. He spoke of the negotiations relative to the measure in which he had taken part, and said he found much agreement with its main objects, but there were many "buts," and on investigation these showed that there was always an axe to grind. Dr. Addison described the main proposal of the Bill as being designed to fix the responsibility with a central authority, to unify control, and to have a common direction and policy. All departments were to join in the effort to save the country from the danger to which it was open during the period of demobilisation on account of the risk of the introduction of tropical diseases hitherto not in existence here. The Bill provided for setting up a central organisation which would have transferred to it the duties of the Local Government Board and its powers in regard to public health, the duties of the Insurance Commissioners, and also the powers of the Board of Education with regard to mothers and nursing children, the powers of the Privy Council under the Midwives Act, and the administration of Part I. of the Children Act in respect of infant life protection. These matters were regarded as sufficient to tackle at the beginning of the Ministry, but later on it was proposed to take powers in regard to mental defectives, the functions of the Pensions Ministry in connexion with disabled soldiers, and the duties of the Board of Education in connexion with medical inspection. The reason why it was proposed to transfer the Central Medical Research organisation to the Privy Council was because it was a common service of all departments. The reason why the Bill did not apply in many respects to Ireland was because the system there was different. He was prepared to make it applicable to Ireland as far as he could in Committee. There had been criticism of the setting up of the Advisory Committees, but he thought they would keep the Minister up to the mark.

Sir DONALD MACLEAN welcomed the proposals coördinating child welfare, but did not see why the medical side of the factory work of the Home Office was not to come under the Ministry.

Sir E. CARSON protested against the fact that the Bill did not apply to Ireland.

Mr. J. H. THOMAS was glad a change was proposed in regard to the Poor-law, which stank in the nostrils of progressive people.

Mr. DEVLIN claimed that Ireland, equally with Scotland, was entitled to a separate Bill.

Mr. SAMUELS (Attorney General for Ireland) repudiated the suggestion that the Irish Government had been careless in making inquiry in the matter. It was the intention of the Irish Government to see that all ameliorative measures for the health of the people in England and Wales would be applied to Ireland. So far as the central machinery was concerned the Irish position was ahead of the English. Where they had broken down in Ireland was that the local administration which had to deal with the practical matters was permissive, and being permissive, the result had been that the people who had the permissive power to put it into operation or not had lamentably failed. There was a Bill in preparation conferring on the Irish Local Government Board powers similar to those of the Board of Education regarding medical inspection and treatment of children. He hoped there would soon be a measure which would deal with the terrible state of public health in Ireland, to see that it was enforced, and that those entrusted with the administration of it should carry out their powers.

Sir WATSON CHEYNE said this was a Bill which he believed, when suitably amended, would form the basis of the erection of a great health organisation. In regard to the machinery of the Bill he laid down the axiom that the health of the people was a matter of national concern rather than of sectional and vested interests. His idea of a Ministry of Health was that they should have a central brain, thinking, investigating, co-relating information from other sources, and spreading information. That brain would have a great deal to do. As a secondary thing to that there would be executive branches which would carry out the information which emanated from the thinking body and apply it to the various local conditions. Without the central brain the organisation they would establish now would in a very few years be out of date because of the advances of medical science. He should like Dr. Addison to consider whether

he should not have a board between the advisory bodies and himself, a board which could co-relate the reports that came from the advisory bodies and then the Minister could digest them. He could not see a Ministry of Health without a research department. He did not believe it would come to anything. The medical profession was in a state of great uneasiness and distress about the Bill, and it would go far to relieve their minds and get more cordial working if they could get an advisory body which was very carefully selected and which could be trusted by the profession and represent the best elements in it. He wished to ask for an assurance that anything of far-reaching importance like, for instance, the taking over or interfering with the great hospitals and teaching schools, would be brought before Parliament, so that they might have an opportunity of discussing it and, if necessary, throwing it out. As far as the medical men in the House were concerned, and he thought as far as the greater part of the profession was concerned, they were sincerely anxious that the Bill should be a great success, and they would do all they could to further it.

Mr. THOS. GRIFFITHS appealed to Dr. Addison on behalf of the Welsh people to give the same treatment to Wales as was to be given to Scotland.

Mr. LESLIE SCOTT urged that the subject of mental deficiency should be taken over by the Ministry of Health when created from the commencement.

Captain LOSEBY said the country was not satisfied with the present method of licensing medical practitioners. The public had a right to claim that those responsible for the health of the nation should be competent to carry out their task, not only at the time of their qualification, but also during the whole period of practice. Something in the nature of refresher courses might be organised.

Dr. MCDONALD heartily approved of the Bill, which was designed to improve public health.

Major FARQUHARSON also spoke in favour of the Bill.

Major MOLSON regretted that the Bill did not take under its care the Medical Research Committee.

Colonel RAW approved of the Bill, but regretted it did not take in the Medical Research Committee.

Major ASTOR (Parliamentary Secretary to the Local Government Board), replying to the debate, said that the Government meant the Bill to be a real one. They would dip into the public purse for it, and it would be money well spent. He was sure that local authorities would get more guidance from a single department than they had got in the past. As to the position of the Medical Research Committee under the Privy Council, he said that research over the widest field should not be limited to a department which only included England and Wales in its survey. But the Privy Council covered, not only the United Kingdom, but would be in touch with the whole British Empire. Far more progress would be made in this way. Topical research, if he might call it so, was carried on by the Local Government Board, and would remain there. But all departments would more readily come to the Privy Council. The Medical Research Committee had come to the conclusion that it would be in the interests of research that the course proposed in the Bill was the right one. In conclusion, he paid a tribute to the efforts of the late Lord Rhondda for his steady advocacy of the establishment of a Ministry of Health. Since the beginning of the war the country had lost a quarter of a million infants because of bad ante-natal and post-natal conditions. There was a need for a Ministry of Health before the war. It was doubly necessary now.

The Bill was read a second time.

On the motion of Captain CRAIG, an instruction was agreed to giving the Committee on the Bill power to extend the Ministry of Health Bill to Ireland.

Separate Bill for Scotland.

At question time Sir H. DALZIEL asked the Secretary for Scotland whether he had received an intimation to the effect that Members representing Scotland were unanimous in their demand that a separate Health Bill should be introduced applying to that country, and, with a view to saving the time of the House, could he now state what the intentions of the Government were in the matter.—Mr. MUNRO replied: I have received an intimation of the general opinion held by Scottish Members in this matter, and I have discussed it with the Leader of the House. In view of the change of procedure which was adopted last week, the Government have decided to withdraw the Scottish Application Clause from the Bill, to amend its title accordingly, and to introduce a separate Bill dealing with Scotland only.

A CONFERENCE on "Influenza and its Prevention," arranged by the council of the Institute of Hygiene, meets at the Institute, 33, Devonshire-street, London, W. 1, at 3.30 P.M. this (Friday) afternoon. Sir Malcolm Morris will occupy the chair.

Medical News.

CENTRAL MIDWIVES BOARD.—A meeting of the Central Midwives Board was held at Queen Anne's Gate Buildings, Westminster, on Feb. 20th, with Sir Francis H. Champneys in the chair.—A letter was considered from the county medical officer of health for Cheshire inquiring whether nurse midwives in attending on, or expecting to be called to, cases of confinement should be permitted to attend cases of influenza, and if so under what conditions. The Board decided that the county medical officer of health for Cheshire be informed that in the view of the Board his attitude with regard to cases of influenza attended by midwives who also attend maternity cases, as detailed in his letter of Dec. 27th, 1918, is correct and strictly in accordance with the rule of the Board E. 6.—A petition was presented from the Midwives Institute praying the Board to represent to the Privy Council under Section 1 (c) of the Midwives Act, 1918, that it is expedient to modify the constitution of the Board by conferring on the Institute power to appoint a certified midwife as one of its representatives on the Board. The Board decided that the secretary be directed to acknowledge the petition.—The Board having considered the question of printing the Midwives Roll for 1919 decided that having regard to the special circumstances of the case, and particularly to the great expense involved in printing the Midwives Roll at the present time, the Roll for 1919 be not printed, but that the Provisional Roll for 1919 be printed as usual.

ROYAL MEDICAL BENEVOLENT FUND.—At the last meeting of the committee, held on Feb. 11th, 18 cases were considered and £193 6*s.* voted to 15 of the applicants. The following is a summary of some of the cases relieved:—

Widow, aged 69, of M.R.C.S. Eng. who was a surgeon in the Royal Navy for 21 years and then practised in Cornwall and died in November, 1918. Was left without means and has an invalid daughter, aged 43. Rent and rates £18 a year. Had some temporary assistance from friends. Husband's income ceased at his death. Voted £18 in 12 instalments.—Widow of M.R.C.S. Eng. who practised in Manchester and died in 1913. Was left with four children, ages now 11-23. Has a house, which lets at £25 a year, and small cottage, now unoccupied. Applicant works as a sickness visitor and receives £84 10*s.* a year. Receives from children £104. Rent £25. One daughter has been ill for three months. Wants help for the education of the youngest child. Voted £8 6*s.*—Widow, aged 44, of M.B. Lond. who practised in Cheshire and died in 1907. Was left with two boys now aged 12 and 14. Applicant acts as matron of a day and resident nursery and receives £60 a year. Youngest boy lives with her at present, but this privilege is not likely to be continued. Eldest boy earns 9*s.* per week, but mother has to supplement this by 11*s.* per week. Wants help for youngest boy's school fees. Was helped by the Fund in 1911 and 1912, £10 each time. Voted £10.—L.R.C.P. & S. Edin., aged 72, married, who practised at Dovercourt. Has one daughter, aged 32, who helps at home. Has lost an annuity of £180 through the war. Earns £102 from practice, less £12 for drugs. Has received £39 from the National Relief Fund, and an annuity of £8. Rent £35 per annum. Voted £10.—Widow, aged 37, of L.R.C.P. Edin. who practised at Battersea and died in 1917. Applicant left with three children, ages now 3-11, the two eldest going to school. She has been living on the capital left by her husband, which is now nearly exhausted. Weekly home expenses £3. Rent 11*s.* Voted £10.—M.R.C.S. Eng., aged 73, widower, who practised in Devonshire and as a ship's surgeon. Income £30 from another charity and £19 from relative. Was torpedoed in 1917, and as a result of exposure suffers from rheumatism and asthma. Relieved three times, £11. Voted £12 in 12 instalments.—Orphan, aged 13, of L.R.C.P. Edin. who practised in Lancashire and died in 1917. Applicant was left with two elder brothers penniless, and friends looked after her. She is now receiving a good education and doing well, and help is asked for towards paying school fees. A grant of £25 was made last year to help her and her brother, who is now earning his living. Voted £15.—Daughter, aged 60, of M.D. Lond who practised in London and died in 1868. Applicant left without means, and has earned a living by acting as a nurse and housekeeper, but never been able to save. Health now very indifferent and not able to work for any long period. Relieved five times, £24. Voted £12 in 12 instalments.—Daughter, aged 56, of M.R.C.S. Eng. who practised at Hadleigh and died in 1877. Applicant is a chronic invalid, and her only income is from dividends £18, and R.U.K.B.A. pension, £21. Relieved three times, £26. Voted £12 in 12 instalments.—Daughter, aged 62 of M.R.C.S. Eng. who practised at Box and died in 1894. Applicant is one of three sisters, and they are all delicate. Earns £18 as a companion, and has £12 from another charity. Another sister, who is unable to work, receives help from the Fund and Guild. Relieved five times, £84. Voted £18 in 12 instalments.—Daughter, aged 56, of M.R.C.S. Eng. who practised in London and died in 1880. Applicant is a chronic invalid and unable to work, and lives with a widowed sister. Her only income is a pension from the R.U.K.B.A. of £25. Relieved eight times, £96. Voted £12 in 12 instalments.

Subscriptions may be sent to the acting honorary treasurer, Dr. Samuel West, at 11, Chandos-street, Cavendish-square, London, W. 1.

A PRESENTATION will be made to Dr. H. J. Cardale, chairman of the London Panel Committee, at a luncheon to be held at the Holborn Restaurant on March 4th, at 1.45 P.M., Sir James Galloway in the chair.

A MEETING was held at the Wigmore Hall, London, on Sunday last, Feb. 23rd, under the auspices of the Medico-Political Union and the chairmanship of the President of the Union, Mr. Frank Coke, at which the following resolution was proposed:—

That in view of the far-reaching changes inevitable in the medical services of this country consequent on the coming Ministry of Health, it is essential that the profession should be solidly and democratically organised on a trade-union basis to enable it to negotiate effectively with the Government in the interests of the community no less than those of the profession.

The resolution was moved by Dr. J. A. Angus and eloquently seconded by Dr. E. H. M. Stancomb. An amendment for the insertion of words whereby a union should be formed on trade-union principles and be affiliated to the Labour Party and to the Trade Union Congress, having been unsuccessfully brought forward, the original resolution was carried by a majority of 207 to 30.

MEDICO-PSYCHOLOGICAL ASSOCIATION OF GREAT BRITAIN AND IRELAND.—A quarterly meeting of the association was held in the rooms of the Medical Society of London on Feb. 20th, Dr. John Keay presiding. A message of greeting from the Medico-Psychological Society of Paris was read, and a suitable letter drafted in response. The resignation of Dr. R. H. Steen as general secretary was accepted with regret, and Dr. R. Worth elected in his place. Dr. E. P. Cathcart read a communication on Psychic Secretion.

AT a public meeting of the subscribers and supporters of the Aberdeen War Dressings Depôt, held in the town hall on Feb. 22nd, it was decided that the surplus funds of the society should be disposed of by giving £1200 to endow a bed in the Royal Infirmary, to be used, if necessary, for the treatment of pensioners, and the remaining £177 to the Sick Children's Hospital, which gifts would constitute a permanent war memorial of the work of the War Dressings Depôt. This society has had subscribed to it in all £11,853, and has contributed 2,156,842 dressings and other necessary articles, and in the early days of war did a great deal towards the standardising of war dressings.

MEDICAL DEFENCE UNION: THE NOTIFICATION AND PREVENTION OF SPECIFIC DISEASES.—The following resolutions were passed unanimously, on Feb. 20th, at a meeting of the Council of the Medical Defence Union, Sir John Tweedy presiding:—

"That resistance to notification should be urged upon the medical profession, as being not only a breach of the confidence which exists between patient and doctor, but also that notification would lead to concealment of disease."

"That the profession be encouraged to recommend to patients the adoption of the very simple and easily carried out measures of prophylaxis, which have been proved to be effective in the Army and Navy."

HOSPITAL ACCOMMODATION: ADDRESS BY SIR E. NAPIER BURNETT.—On Feb. 20th there was a large gathering of medical men and others in the library of the Royal Victoria Infirmary, Newcastle-on-Tyne, to hear an address by Sir E. Napier Burnett on Hospitals and their Relation to the State. The chair was taken by Professor Rutherford Morison. After recounting his recent experience in military hospital administration the lecturer dealt with the shortage of accommodation in the civil hospitals of the country and with the loss entailed by the necessity for waiting lists. A resolution was unanimously carried urging the Government to hold a comprehensive inquiry into the present hospital accommodation. On the same evening Sir E. Napier Burnett was entertained by the members of the North of England Glasgow University Club at a complimentary dinner.

Appointments.

GOULDEN, C. B., M.D. Camb., has been appointed Assistant Surgeon to Royal London Ophthalmic Hospital (Moorfields Eye Hospital).

SIMPSON, J. A., M.B. Aberd., Certifying Surgeon under the Factory and Workshop Acts for the Alford District of the County of Aberdeen.

Vacancies.

For further information refer to the advertisement columns.

Aberdeen Royal Infirmary.—Asst. P. and Two Asst. S.
Aylesbury, Royal Buckinghamshire Hospital.—H.S.
Birmingham General Dispensary.—Res. M.O. £360.
Blackpool, Victoria Hospital.—H.S. £250.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. £150.
Bournemouth, Royal Victoria and West Hants Hospital, Boscombe Branch.—H.S. £200.
Bradford Childrens' Hospital.—H.S. £170.
Chartham, near Canterbury, Kent County Lunatic Asylum.—Med. Superintendent. £800.
Chichester, Royal West Sussex Hospital.—H.S. £200.
Dartford, Darenth Industrial Colony.—Temp. Asst. M.O. £7 7s. p.w.
Dudley, Guest Hospital and Eye Infirmary.—Asst. H.S. £120.
East African Medical Appointments.—M.O. £400-£20-£500.
Flintshire Education Committee.—Asst. M.O. £400.
Hereford, Herefordshire General Hospital.—H.S. £200.
Hertfordshire County Council.—School Dentist. £350.
Holborn Schools, Milcham.—M.O. £130
Hospital for Diseases of the Throat, Golden-square, W.—Hon. Anæsth. and Hon. Registrar.
Hospital for Sick Children, Great Ormond-street, W.C.—P.
Hull and Sculcoates Dispensary.—M.O.
Huntingdon County Hospital.—Res. M.O. £120.
Johannesburg, South African School of Mines and Technology.—Prof. of Anat. and Prof. of Phys. £1000.
Leeds Public Dispensary.—Three Hon. Asst. Dental Surg.
Leicester Corporation Isolation Hospital and Sanatorium.—Two Res. M.O. £350 and £300. Also Female M.O. £400.
Liverpool, Royal Southern Hospital.—Three Res. H.S., Two H.P., and One non-Res. C.O. £100.
London Homœopathic Hospital, Great Ormond-street, Bloomsbury, W.C.—Clin. Path. and Bact. £200.
Manchester Children's Hospital Pendlebury, Out-patients' Department, Garside-street, Manchester.—Asst. M.O. £200.
Manchester Northern Hospital for Women and Children, Park-place, Cheetham Hill-road.—H.S. £150.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Nottingham Children's Hospital.—Female Res. H.S. and Res. H.P. and Anæsth. £250 and £200 respectively.
Nottingham City Asylum.—Second Asst. M.O. £300.
Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—H.S. and Cas. H.S. £100. Also Temp. Asst. P., and Asst. for Out-patient Cases.
Reading, Royal Berkshire Hospital.—Second H.S. £200.
Royal National Orthopædic Hospital.—Res. H.S. £200.
Samaritan Free Hospital for Women, Marylebone-road.—H.S. £150.
Scarborough Hospital and Dispensary.—Two H.S.
Shantung Christian University Medical School (Tsinanfu, N. China).—Medical Missionaries.
Sheffield Royal Hospital.—Cas. Officer. £130.
Sheffield Royal Infirmary.—Cas. Officer Also Oph. H.S. £150.
Staffordshire Education Committee.—Female Asst. M. Inspectors. £400.
Stockport Infirmary.—Jun. Res. H.S. £200.
Union of South Africa Mental Hospital Service.—Six Asst. Phys. £380.
Warwickshire and Coventry Joint Committee for Tuberculosis.—Asst. Tubere. Officer. £400.
Western Ophthalmic Hospital, Marylebone-road, N.W.—Two Asst. S.
Whitehaven and West Cumberland Infirmary.—Res. H.S. £180.
Wolverhampton and Midland Counties Eye Infirmary.—H.S. £200.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of vacancies for Certifying Surgeons under the Factory and Workshop Acts at Shefford, Woburn Sands, Beaminster, and Teignmouth.

Births, Marriages, and Deaths.

BIRTHS.

ALLCHIN.—On Feb. 21st, at Bury-road, Alverstoke, Hants, the wife of Temp. Surg. Lieut. F. M. Allchin, M.B., B.S., Royal Navy, of a daughter.

DASHWOOD-HOWARD.—On Feb. 19th, at The Mowle, Ludham, Norfolk, the wife of A. Dashwood-Howard, M.D., L.R.C.P., late Captain, R.A.M.C., of a daughter.

EDMOND.—On Feb. 15th, at Cruck Meole House, Hanwood, Shropshire, the wife of Major W. S. Edmond, F.R.C.S., R.A.M.C., of a daughter.

FARMER.—On Feb. 19th, at "Stanwell House," Stanwell, near Staines, the wife of Captain Herbert L. Farmer, R.A.M.C., of a daughter.

TOOTH.—On Feb. 17th, at Clifton Nursing Home, Bristol, the wife of Frederick Tooth, M.R.C.S., L.R.C.P., of a son.

WRIGLEY.—On Feb. 25th, at 8, Conyngham-road, Victoria Park, Manchester, the wife of Captain P. R. Wrigley, R.A.M.C. (T.F.), of a daughter.

MARRIAGES.

JONES—THATCHER.—On Feb. 15th, at S. John of Jerusalem, South Hackney, William Henry Jones, M.B., B.S. Lond., temporary Lieutenant, R.A.M.C., to Gwendolen Frances Mildred, second daughter of the Rev. and Mrs. W. Romaine Thatcher, of South Hackney.

NICHOLAS—HACKING.—On Feb. 18th, at Holy Trinity, Sloane-street, Captain C. F. Nicholas, R.A.M.C., to Ann Kathleen, fourth daughter of the Venerable Archdeacon and Mrs. Hacking, Hill House, Southwell, Notts.

DEATHS.

ANDREWS.—On Feb. 20th, at Galsgill, Elstree, Samuel Andrews, M.R.C.S., L.R.C.P. Lond., aged 68.

BOWER.—On Feb. 18th, suddenly, at Barnsbury-road, N., Edward I. Bower, L.R.C.P. Lond., M.R.C.S., L.S.A., aged 69.

MICHAEL.—At Elmwood, Woodthorpe, Nottingham, of bronchitis following influenza, Henry James Michael, Lieutenant-Colonel, R.A.M.C. (retired), aged 62 years.

NIAS.—On Feb. 20th, at a nursing home, Joseph Baldwin Nias, M.D. Oxon., of Rosary-gardens, S.W.

STEPHENSON.—On Feb. 24th, at Bonaccord-crescent, Aberdeen, William Stephenson, M.D., LL.D., F.R.C.S.E., Emeritus Professor of Midwifery of the University of Aberdeen, in his 82nd year.

WISE.—On Feb. 24th, at Dunstowe, Launceston, Cornwall, Charles Henry Wise, M.D., J.P. (late of Walthamstow), in his 65th year.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Communications relating to editorial business should be addressed, exclusively to The Editor of THE LANCET, 423, Strand, London, W.C. 2.

Notes, Short Comments, and Answers to Correspondents.

THE VITAL NEED.

Professor F. G. Hopkins, of the University of Cambridge, the pioneer of the vitamine theory, delivered the third of the series of lectures on Physiology and National Needs at King's College on Feb. 19th, his subject being Vitamines, Unknown but Essential Accessory Factors of Diet. In the absence of Lord d'Abernon, the chairman, and of the Principal of the College, both of whom were suffering from the prevailing epidemic, Professor W. D. Halliburton presided. Although man had through the ages accumulated large experience in questions relating to food, yet in the particular matter of nutrition the results of scientific research might forestall experience, which was always slow and expensive. In a community which could command a sufficient variety of fresh food, taste, appetite, and instinct were sufficient to ensure that the individual was properly nourished; but in states of civilisation there was a tendency to interfere with natural foods, and only a proportion of their constituents was presented to the consumer. The science of the nineteenth century had made it clear that it was the quality and not the quantity of food which was all important. The essential elements for human nutrition were proteins, fats, carbohydrates, and a proper supply of mineral salts, but it had been found that an addition to these substances was needed, a something which was produced by plants in appreciable quantities, as well as a something which was developed in small quantities, the nutritive importance of which was out of all proportion to the small amount in which these substances occurred in natural foodstuffs.

Beri-beri.

In many rice-eating communities the population suffered from beri-beri, in which an extreme state of emaciation, paralysis, and pronounced œdema occurred. For many years efforts had been made, but without success, to find a microbic cause for the disease. Damaged rice had been suspected, but it was ultimately found that the trouble was due to the way in which the rice was prepared, an essential factor necessary for food being removed in the course of preparation. In 1897 the Dutch physician Eijkman brought forward evidence to show the truth of this conception. In 37 prisons in the districts which he studied, the diet was unpolished rice; in 13 prisons polished and unpolished rice; and in 51 prisons polished rice. Taking the prison population at nearly 300,000 and collecting the cases per 10,000, there was 1 case among those living on unpolished rice, on the mixed rice there were 416 cases, and on the polished rice 3900.

Experiments showed that the missing element in the rice was to be found in the layer of tissue under the husk which was known as the silver skin, in the embryo, and in the bran. These were left in by the native method of preparation, but removed by the modern milling and polishing process. From these investigations Eijkman concluded that the substance which was removed neutralised another factor in the whole which was harmful; the simple suggestion that something really necessary in itself was removed did not occur to him.

The Vitamines.

The lecturer described some feeding experiments on animals, illustrated by charts thrown on the screen, which showed that if the food consisted of pure proteins, fats, carbohydrates, and mineral salts the animals not only did not thrive, but, after a longer or shorter interval, died, whilst an extremely small amount of an addendum to the diet converted it into a perfectly sufficient nutriment. In some early experiments which he had conducted the addendum consisted of a small quantity of milk. It was essential that these additions to the food should be obtained from living tissue. We did not know what these substances were which we called vitamines. Many patient attempts had been made, and were being made to isolate them, but so far without success, though it was certain that the factors were actual substances and not qualities. They could be extracted, precipitated, and redissolved, but they could not be separated completely from other substances.

Their actual chemical nature and the exact amount necessary for the needs of the body were not known. There were at least three of these substances, each one distinguished from the other two, and each one serving some particular function in nutrition. As a proof that at least two existed, it had been shown that if an animal were fed on the pure diet already referred to, and the fat were an animal fat, growth was inhibited, but on adding watery extracts of various foodstuffs, such as watery extracts of the wheat grain, the cortex or embryo, the animal grew and generally maintained excellent health. This did not occur if a vegetable fat were used in the diet. Its value to the body as fat was probably just as good as animal fat, but there was something in the animal fat which was not present in the vegetable. Of the two factors, therefore, one was soluble in water and one was associated with fats, and an animal could not survive unless both were present. Dr. Harden, as the result of some admirable work, had shown the distribution of these two factors. Wheat grain, with the exception of the endosperm, contained both and was especially rich in the water-soluble factor, as was also yeast. Butter was rich in both. Cod-liver oil contained a large amount of fat-soluble substance.

Insufficiency Diseases.

The water-soluble substance was removed when rice was polished, and it was the absence of this which caused beri-beri. It was therefore known as an antineuritic substance. Birds were so sensitive [here the lecturer showed on the screen photographs of pigeons in which neuritic disease had been produced by feeding them on unpolished rice] that if suffering from this affection, by administering to them as small a dose as half a grain of the watery extract the symptoms could be abated in the course of an hour or two. Rickets in children, a disease of great national importance, was associated with the fat soluble vitamine. Dr. Edward Mellanby had shown that it was easy to find a food on which dogs would develop rickets, and just as easy to prevent the condition by making certain additions to their diet, among which were certain fats rich in vitamines. That cod-liver oil was a curative agent for rickets had long been known empirically. The negro population of the United States was particularly prone to this disease, and in a community in which almost every child was a victim striking results were obtained by the administration of cod-liver oil. Mrs. Mellanby[1] had shown that grave errors of dentition occurred through diet. Scurvy was another dietetic disease and would be dealt with by Professor Harden on Feb. 26th, when it would be shown that there was at least a third vitamine which was less soluble than the other two, more easily destroyed by heat, and disappeared more readily when foods were kept. Pellagra was another disease which was associated with qualitative deficiency in the diet.

National Importance of the Dietetic Factor.

These facts were of practical and national importance. Pure white bread did not contain either of the two vitamines mentioned. This was of little consequence to those members of the population who could obtain articles of food containing the vitamines, but the poor would suffer severely by its use. Whereas brown bread and butter was a most excellent combination, white bread and margarine was a radically bad one. The whole vitamine question was of the greatest importance in regard to the child population. It must not be forgotten that polished rice was used a great deal in this country and in poor households the use of tinned foods was very common, salads were seldom eaten, and in some parts of the country very little fruit was used. Especially among children of the poor we had real evidence that the question of vitamine supply was of actual importance. In England, although we might not have beri-beri or pellagra, and though scurvy might be rare, we had much ill-health which stopped short of definite symptoms, minor departures from the normal which occurred before the establishment of actual disease. The absolute absence of vitamines meant disease, their relative absence malnutrition. It was not sufficiently recognised that the vitamines were not made in the animal body but in the plant, and were accumulated in the tissues of the herbivorous animal. From this it followed that if the diet of the nursing mother was deficient in vitamines then ultimately her milk would become so; there was evidence that the milk of animals could be deficient in vitamines. We probably required something to stimulate growth, and the suggestion had been made that every living cell required factors of the same sort. Research in this subject was necessary, and the backing of the public was needed to stimulate the administrator and the politician.

THE METROPOLITAN WATER-SUPPLY DURING OCTOBER, NOVEMBER, AND DECEMBER, 1918.

ALL three months ending the year 1918 showed a diminished rainfall. Thus the mean fall during the month of October at 12 stations which have been selected as giving equal representation for all parts of the Thames basin was 1·77 inches, being 1·52 inches below the average mean rainfall for that month during the previous 35 years. A chemical examination showed that the Thames raw waters deteriorated in quality, while the raw waters of the Lee and New River generally improved. The filtered waters also showed a falling off in chemical quality, though giving satisfactory results on bacteriological examination. While the raw waters of the Thames and New River contained fewer bacteria than

[1] Vide THE LANCET, Dec. 7th, 1918, p. 767.

their respective averages for the year 1917, the raw water of the Lee contained more bacteria than shown in its respective average for 1917. In November the rainfall was 2·62 inches, being 0·08 of an inch below the average mean rainfall for that month during the previous 35 years. There was a chemical deterioration, again, in regard to the raw river waters and some of the filtered supplies, and there were more bacteria in the raw waters of the Thames and Lee than in 1917, but fewer in the New River water. The filtered waters, however, were regarded as satisfactory. In December the rainfall was 2·80 inches, being 0·19 of an inch below the average mean rainfall for that month during the previous 35 years. Chemical examination of the raw waters again showed deterioration in some respects, while the filtered waters showed improvement, though not up to the standard of 1917. The raw Thames water contained more bacteria than its respective average for the year 1917, while the raw Lee and New River waters contained fewer. The filtered waters were bacteriologically satisfactory. Sir A. C. Houston, the Director of Water Examination, Metropolitan Water Board, again points out that nearly the whole of the supply is now stored antecedently to filtration and the improved condition of the water after storage and before filtration is best expressed by saying that on the average about one-third of the pre-filtration samples contain *no* typical *B. coli* in 10 c.cm. of water. The importance of storage is obvious.

BORN IN A WELL.

To the Editor of THE LANCET.

SIR,—In your issue of Feb. 22nd (p. 324) you report a case of a child born in a well, and remark that the incident is probably unique. In the *British Medical Journal* in 1891 I reported a case of "Childbirth in a Well" in the following terms:—

Early in the morning (1 A.M.) of Sunday, December 21st, when the thermometer was many degrees below freezing point, a woman, aged 39, wife of a bricklayer, while in labour with her eleventh child (only one of whom is now alive), left the house, where she was alone in a room with a couple of young girls, and jumped down a well 20 feet deep, with but 2 feet of water at the bottom. Instead of at once calling the husband, who was in bed upstairs, these girls, who had fallen asleep, and only awoke on hearing the splash, ran off to the house where one of them lived, about a quarter of a mile distant, and roused her mother. A man then came back and awoke the husband, who at once got up and let himself down the well, where he fastened the chain round his wife and she was drawn up, but, on reaching nearly the top the chain gave way and let her down again. Some time was then lost in fetching a rope, and she was then drawn out, having been, at the lowest calculation, forty minutes in the well. She was then taken into the house, where she was supported on a chair till about 3 o'clock in her wet clothes, before getting women to come and undress her. After sending her up the husband discovered a child floating in the water. It was not till 10 A.M. (nine hours after she went down the well) that I saw her. I found her on a mattress on the floor, very weak, but wonderfully better than anyone could have expected, and with the placenta, &c., still *in utero*, and this I had some difficulty in removing, having to insert my hand into the womb, when it contracted strongly on my withdrawing it, and with very little hæmorrhage. She has since made most satisfactory progress, and, in fact, has not had a bad symptom, not even after-pains, which is most unusual for a woman who has been confined eleven times. She was probably saturated with "liquor" at the time, as the midwife who saw her in the morning found her lying half on and half off the bed, smelling strongly of brandy, and, again, in the afternoon found her sitting with a jug of ale beside her, and in the evening, having lost her, after some search—amongst other places, looking down the well, as it appeared she had said something about jumping down—she was found in a public-house. Her system appears in this way to have been so anæsthetised as to have prevented much shock at the time, and also after-pains. The only marks after a jump of 20 feet, with only 2 feet of water to break her fall, being a small piece of skin off one leg and few scratches on her hands. A post-mortem examination on the child proved it to have never breathed. I am, Sir, yours faithfully,

Fulbourn, Feb. 23rd, 1919. F. L. NICHOLLS.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.1.

Wednesday, March 5th.

SOCIAL EVENING: at 8.30 P.M.

Dr. A. F. Hurst will discourse on "War Neuroses" (illustrated by cinematograph films and lantern slides).

MEETINGS OF SECTIONS.

Thursday, March 6th.

BALNEOLOGY AND CLIMATOLOGY (Hon. Secretaries—Chas. W Buckley, J. Campbell McClure): at 5.30 P.M.

Discussion:

On "The Work of the Spa Physician in Relation to the Proposed Ministry of Health."

Opener: Dr. C. W. Buckley (Buxton).

Friday, March 7th.

LARYNGOLOGY (Hon. Secretaries—Frank A. Rose, Irwin Moore): at 4.45 P.M.

Cases and Specimens will be shown at 3.45 P.M. by:—

Dr. A. L. Macleod, Mr. G. Seccombe Hett, Mr. G. W. Dawson, Dr. Douglas Guthrie, and others.

The Royal Society of Medicine keeps open house for R.A.M.C. men and M.O.'s of the Dominions and Allies. The principal hospitals in the metropolis admit medical officers to their operations, lectures, &c. Particulars on application to the Secretary at 1, Wimpole-street, London, W.1.

CHILD-STUDY SOCIETY LONDON, at the Royal Sanitary Institute, 90, Buckingham Palace-road, S.W.

THURSDAY, March 6th.—6 P.M., Lecture:—Miss S. Walker: The Training of Teachers from the Child-Study Standpoint.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

Special Eight Weeks' Course of Post-Graduate Instruction. (Details of the Course were given in our issue of Feb. 15th).

LONDON HOSPITAL MEDICAL COLLEGE.

A Special Course of Instruction in the Surgical Dyspepsias will be given at the Hospital by Mr. A. J. Walton. Lectures, given in the Clinical Theatre:—

MONDAY, March 3rd.—1 P.M., Lecture III.:—Dr. Panton: Test Meals. Technique for Acidity. Value of Results. Technique for Motor Power. Examination of Fæces.

FRIDAY.—1 P.M., Lecture IV.:—Dr. G. Scott: Radiological Examination of Upper Abdominal Lesions. Value of Opaque Meals.

UNIVERSITY OF LONDON, KING'S COLLEGE, AND KING'S COLLEGE FOR WOMEN.

Course of Six Public Lectures arranged in conjunction with the Imperial Studies Committee of the University on Physiology and National Needs:—

WEDNESDAY, March 5th.—5.30 P.M., Lecture V.:—Prof. D. N. Paton: Physiology and the Study of Diseases.

ST. THOMAS'S HOSPITAL MEDICAL SCHOOL (UNIVERSITY OF LONDON), Governors' Hall, St. Thomas's Hospital, S.E.

A Series of Ten Lectures on Diseases met with in the Sub-tropical War Areas (illustrated with lantern slides, charts, diagrams and microscopical preparations).

WEDNESDAY, March 5th, AND FRIDAY.—5 P.M., Lectures I. and II.:—Dr. L. S. Dudgeon: Malarial Fever.

ROYAL INSTITUTE OF PUBLIC HEALTH, in the Lecture Hall of the Institute, 37, Russell-square, W.C.

Course of Lectures and Discussions on Public Health Problems under War and After-war Conditions:—

WEDNESDAY, March 5th.—4 P.M., Dr. W. J. O'Donovan: The War-Time Experience of Factory Medical Officers and the Position of Factory Medicine under Peace Conditions.

CHADWICK PUBLIC LECTURES, at the Technical College Hall, Bradford.

THURSDAY, March 6th.—7.30 P.M., Prof. Legge: Industrial Poisoning and its Prevention—I., Anthrax and the Wool Industries (illustrated by lantern slides).

Communications, Letters, &c., to the Editor have been received from—

A.—Dr. F. W. Alexander, Lond.; *Annals of Medical History*, New York, Editor of; *American Journal of Care for Cripples*, New York.

B.—Dr. N. Bardswell, M.V.O., Lond.; Mr J. C. Bhatt, Hyderabad; Dr. M. Benaroya, Lond.; Col. W. P. S. Branson, A.M.S.; Dr. A. G. Bateman, Lond.; Dr. M. W. Browdy, Manchester.

C.—Messrs. Chamberlin, Donner and Co., Manchester; Miss J. Cowper, Lond. Dr. R. Coope, Liverpool; Conjoint Board of Scientific Societies, Lond.; Miss H. Chesshire, Lond.; Messrs. Cassell and Co., Lond.; Dr. F. G. Cawston, Durban; Mr. F. W. G. Clinton Lond.; Mr. T. Campbell, Wigan, Chadwick Trust, Lond.; Lt.-Col. E. M. Cowell, D.S.O., R.A.M.C.

D.—Capt. J. Driberg, R.A.M.C., Lond.; Col. T. A. H. Danes, Santa Cruz, California; Dr. J. R. Day, Lond.; Dr. C. H. Duncan, New York.

E.—Dr. C. C. Easterbrook, Dumfries.

F.—Miss M. H. Fraser, M.B., Lond.; Col. N. Falchnie, A.M.S.; Dr. J. A. Faiser, Leicester; Factories, Chief Inspector of, Lond.; Dr. C. E. S. Flemming, Bradford-on-Avon; Capt. J. G. Forbes, R.A.M.C.

G.—Dr. W. Gordon, Exeter; Dr. W. J. Grant, Milford; General Medical Council, Lond., Acting Registrar of; Messrs. C. Griffin and Co., Lond.

H.—Humanitarian League, Lond., Sec. of, Prof. W. D. Halliburton, Lond.; Dr. R. A. P. Hill, Watford.

I.—Incorporated Institute of Hygiene, Lond.

J.—Major W. Johnson, R.A.M.C. (S.R.)

K.—Dr. R. Knox, Lond.; Mr. W. Kedge, Ipswich.

L.—Mr. V. W. Low, C.B., Lond.; Mr. E. C. Lowe, Leicester; Local Government Board, Lond., Sec. of.

M.—Medical Research Committee, Lond.; Dr. J. Maberly, Woodstock; Dr. P. R. Manning, Springfield, Mass.; Mr. C. Macmahon, Lond.; Dr. H. A. Macewen, Lond.; Dr. J. P. McGowan, Liverpool.

N.—National Baby Week Council, Lond.; Dr. H. P. Newsholme, Trowbridge; *National Food Journal*, Lond.

O.—*Overseas*, Lond., Asst. Editor of.

P.—Mr. W. H. Plows, Lond.; Mr. F. H. Perrycoste, Polperro; Mr. J. A. P. Perera, Sheffield; Panel Committee for the County of London.

R.—Mr. A. T. Roworth, Lond.; Dr. G. M. Robertson, Edinburgh; Royal Society, Lond.; Dr. F. G. Rose, Georgetown, Demerara; Dr. H. Renney, Sunderland; Capt. J. A. Ryle, R.A.M.C.; Royal Society of Arts, Lond.; Royal Institution, Lond.

S.—Dr. A. G. Shera, Netley; Capt. E. N. Snowden, R.A.M.C. (T.); Prof. E. G. Sieslnger, Lond.; Capt. C. P. Strange, R.A.M.C.; Dr. C. Slater, Lond.; Sell's World's Press, Lond., Editor of.

T.—Capt. D. Thomson, R.A.M.C.; Mr. W. S. Tietjen, Lond.; Triplex Safety Glass Co., Lond.; Mr. P. Turner, Lond.; Prof. E. H. Tweedy, Dublin; Mr. C. W. J. Tennant, Lond.

U.—University of London Military Education Committee, Lond., Sec. of.

V.—Mr. R. M. Vick, Lond.; Mr. P. C. Varrier-Jones, Cambridge.

W.—Dr. F. J. Waldo, Lond.; Surg.-Lieut. J. G. Wardrop, R.N.; Mr. C. H. Whiteford, Plymouth; Wellcome Chemical Research Laboratories, Lond.; Dr. N. Walker, Edinburgh; Mr. E. Wortley, Roxeth; Mgr. M. E. Carton de Wiart, Lond.